THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 43 JUNE, 1938 No. 3

INDEX TO CONTENTS

Rubber Technology Conference 163
By Royce J. Noble

Titles and Authors of Papers at Rubber Technology Conference 165

Ford Tire Plant 168

A German Process for Production of Sponge Rubber .. 172
By R. R. Olin

Charles Goodyear (A Biography) 174
By P. W. Barker

New Equipment Section 178

One Hundredth Anniversary of the Hodgman Name .. 187

REGULAR DEPARTMENTS

Late Domestic News	181	**Editorials**	180
Financial News	188	**Chemical Markets**	193
Book Reviews	179	**Statistics**	194
Los Angeles News	189	**Market Place**	198
Names in the News	184	**Advertising Index**	202
Rubber, Cotton Markets ...	192	**Classified Ads**	202

THE RUBBER AGE, published on the 15th of each month by the Palmerton Publishing Company, Inc., at East Stroudsburg, Pa. Editorial and Advertising offices at 250 West 57th Street, New York City. Established 1917.

Entered as Second Class Matter, October 20, 1933, at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879.

Subscription Rates: Domestic, $2.00 a year; Canada, $2.50; Foreign, $3.00. Single copies, up to 3 months old, 25 cents; over 3 months old, 50 cents.

Telephone COlumbus 5-2923, 5-2924

Contents Copyrighted 1938 by the Palmerton Publishing Company, Inc. Indexed in Industrial Arts Index.

PAUL L. PALMERTON.....President
E. D. OSBORN.....Vice-President and Sec'y
PETER P. PINTO.....Treasurer

M. E. LERNER.....Managing Editor
R. E. GAINES.....Circulation Manager
PETER P. PINTO.....General Manager

Have you tested the new

New Jersey zinc

ZINC SULFIDE

CRYPTONE ZS-230

It's better in

Color and Aging in Sulfur Chloride Cures

Color and Sun-Checking Resistance in White sidewall tires in combination with Horse Head XX Red 203 Zinc Oxide

Color in Latex - - Readily Dispersed and Stable

Value - - Specific Gravity 3.92

THE NEW JERSEY ZINC COMPANY
160 Front Street New York, N. Y.

Please send a sample and information on your new ZINC SULFIDE, Cryptone ZS-230.

Name _____

Address _____

The Rubber Age

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 43 June, 1938 No. 3

Rubber Technology Conference

By Dr. Royce J. Noble*

THE first International Rubber Technology Conference, held in London on May 23 to 25, under the auspices of the Institution of the Rubber Industry, was a highly successful effort to bring together the rubber technologists of the world for discussion of their mutual problems. Approximately 500 delegates from 18 countries were in attendance. The success of the undertaking was due in large part to the complete cooperation of leading technical organizations throughout the world, including the American Chemical Society, the Rubber Division of which was officially represented by its Chairman, A. R. Kemp of the Bell Telephone Laboratories.

Special recognition is due to the efforts of J. R. Scott, T. R. Dawson and B. D. Porritt, of the Research Association of British Rubber Manufacturers, whose able assistance to W. F. V. Cox, secretary of the I. R. I., made possible the arrangement of an unusually large number of papers—105 in all—into a program of outstanding merit and interest. Of the American technologists contributing papers, 12 attended the Conference and participated in the discussions.

The Conference was officially opened at 10:30 A.M., Monday, May 23, in the Edward VII Rooms of the Hotel Victoria, when S. T. Rowe, president of the I. R. I., introduced Sir William Bragg, president of the Royal Society, who acted as Honorary President of the Conference.

After acknowledging the introduction and thanking the sponsors of the Conference for bestowing the privilege of acting as Honorary President upon him, Sir William launched into a serious discussion of the technological problems of the rubber industry. He referred to the fact that all scientists interested in materials in which molecules played a part had a common basis for cooperation. Describing the rubber molecule as being particularly "difficult," he said that it was yielding, partly because we were able to apply the information gained from the study of molecules in other fields.

Sir William also decried the layman's attitude to science and research. He stated that it was absolutely necessary in these days that the gradual growth of knowledge and its application should be more generally understood. Conferences, such as the present one, were important in his estimation because they helped advance the knowledge of an industry and indirectly pooled such knowledge with the rest of the world. He also made the emphatic statement that any country which did not participate in research work must drop behind the other nations of the world.

(*) Dr. Noble, who presented a paper at the Rubber Technology Conference, also acted as special representative of THE RUBBER AGE. While attending the Conference, he was made a Fellow of the Institution of the Rubber Industry.

A short session devoted to the applications of rubber, at which eight papers were presented for discussion, was held on Monday morning. Each session was ably handled in this manner: A pre-selected Chairman introduced a pre-selected General Reporter. The Reporter then presented a brief review of the more important topics in the papers slated for discussion. In this way, he directed the discussion. As each paper was discussed the author (or authors) were introduced by the Chairman, who also introduced those entering into the discussion. The papers were not actually read as all delegates were provided with pre-prints of the Conference papers upon registration. Records were made of all contributions to the discussions and will be made part of the printed Proceedings.

500 Delegates Attend Luncheon

Approximately 500 delegates and guests attended a luncheon on Monday given by the Research Association of British Rubber Manufacturers and the British Rubber Producers' Research Association at the Hotel Victoria. So large was the gathering, that a second luncheon had to be served in the Hotel Grosvenor for some of the guests.

At the luncheon, toasts to the King and the Conference were proposed by H. Eric Miller, chairman of Harrisons & Crosfield, Ltd., who presided. In reply to the latter toast, Sir William Bragg referred to the development of the rubber industry in the past 25 years, both in volume and diversity, and to the importance of further technical knowledge concerning this basic material. A toast was also proposed by R. W. Lunn, chairman of the R. A. B. R. M., to the luncheon guests, to which replies were made by F. D. Ascoli and W. J. de Jonge, noted British and Dutch technologists, respectively.

In his reply, Mr. Ascoli, who was chairman of the Executive Committee of the Conference, said that the Conference represented the largest and most distinguished body of rubber technologists that had ever come together and predicted that when the discussions were published they would represent a source of knowledge and a fund of wisdom for both research associations acting as hosts at the luncheon and thus contribute to further research. Mr. de Jonge confined his talk to general subjects, including production and consumption of crude rubber, and also discussed the danger to the plantation industry created by the rapid development of the synthetic rubbers.

The afternoon session on Monday was devoted to the subject of the durability of rubber, and eight papers on this most important topic were presented. Discussion was active, and terminated only with the closing of the session late in the day.

On Monday evening the delegates to the Conference were presented to the Rt. Hon. Viscount Hailsham, Lord President of the Council and Patron of the Conference, and Lady Hailsham, at a reception by His Britannic Majesty's Government at Lancaster House. Approximately 200 attended.

Because of the large number of papers presented to the Conference Committee it was necessary to conduct two sessions simultaneously during Tuesday and Wednesday, one session being held in the Hotel Victoria, the other in the Royal Empire Society Building, situated opposite the Victoria. Each session was limited to 1½ hours and confined to papers dealing with one phase of rubber technology. Durability, compounding materials, physics, latex, chemistry, synthetic rubber, and plantation subjects were among the topics of the respective sessions. About one hour was allowed for general discussion. Opportunity was provided, however, for the presentation of additional comments in writing, so that they, too, could be made part of the Proceedings.

Sir William Bragg, Honorary President of the Conference reading his address of welcome. Also seen are F. D. Ascoli (left) and S. T. Rowe (right). Mr. Rowe is president of the I. R. I.

All delegates attended the closing general meeting of the Conference held late in the afternoon on Wednesday at the Hotel Victoria. Mr. Rowe thanked all of the delegates for their cooperation, expressed special thanks to those whose active work had made the Conference the success he believed it to be, and then called upon various official delegates.

The first of these was Dr. A. R. Kemp who thanked the I. R. I. and affiliated organizations for their kind hospitality, expressed gratitude for the opportunity of being present, and stressed the great value of the technical papers presented. Then, on behalf of the Rubber Division, A. C. S., Dr. Kemp invited those present to attend the Goodyear Centennial Meeting to be held in Boston in the Fall of 1939. Among other official delegates taking the floor was Dr. Konrad, of Germany, who invited the attending technologists to attend a similar rubber conference planned in Cologne in 1940.

Official Banquet by Invitation

On Wednesday night, an official banquet was held in the Edward VII Rooms of the Hotel Victoria, attended by approximately 300. Viscount Hailsham presided, and after the toast to the King a toast to the Institution of the Rubber Industry was proposed to which a reply was made by Mr. Rowe. A toast to the overseas delegates, made by Sir George Beharrel, was replied to by Professor G. Bruni, of the Pirelli Company, Milan, Italy. In a witty vein, Eric Macfayden, director of several plantation companies, then proposed a toast to the assembled guests, to which a reply was made in similar vein by R. P. Dinsmore, assistant factory manager, Goodyear Tire and Rubber Company, Akron, Ohio.

A series of visits was arranged for the delegates on Thursday, following the close of the Conference, the morning being devoted to sightseeing drives through London, with visits to the Imperial Institute and the Northern Polytechnic. On Thursday night a number of the delegates took a train to Glasgow where they spent all day Friday visiting the Empire Exhibition, including the Rubber Pavilion sponsored by the Rubber Growers' Association. They returned to London on Saturday morning.

A complete list of papers, together with authors, company connections and addresses, will be found on the following three pages.

Titles of Papers at Conference

Because of the unusually large number of papers presented at the Rubber Technology Conference, held in London, May 23 to 25, and because of the fact that complete copies of all papers, including discussions, will be made available in bound book form shortly, we are not presenting abstracts of the papers. We are, however, publishing herewith the titles of all papers, including names of authors and company connections, with addresses. The numbers of papers, shown in the left hand columns, are those designated by the Conference Committee. THE RUBBER AGE *has on hand a complete set of all these papers, including abstracts of each, and upon application from any of its readers will promptly furnish a copy of any desired abstract without cost, or photostat copies of any paper can be furnished at cost, which will be quoted on request.* Please furnish number of paper, as well as title, in writing for either abstracts or complete copies. [Editor].

APPLICATIONS OF RUBBER

Paper No.

45 **The Uses and Possibilities of Rubber in Agriculture.** By Alexander Hay, Rubber Growers' Association, Inc., London, England.

74 **Rubber in Agriculture in France, and the Propaganda Center of the Institut Francais du Caoutchouc.** By P. Petithuguenin, Institut Francais du Caoutchouc, Paris, France.

95 **Recent Progress in Heavy Motor-Vehicle Tyres.** By G. Venosta, Societa Italiana Pirelli, Milan, Italy.

3 **Danish Tire-Market Organization.** By H. Kjolsen, Autogummi-Fordhandler-Foreningen, Copenhagen.

100 **An Investigation of the Performance of Flat and V-Type Transmission Belts.** By S. A. Brazier, W. Holland-Bowyer and C. E. Mellers, Dunlop Rubber Co., Ltd., Manchester, England.

68 **The Applications of Rubber Associated with the Linen and Sisal Industries.** By W. H. Gibson, Linen Industry Research Association, Lambeg, County Antrim, Ireland.

88 **Some Developments and Problems of Elastic Weaving.** By J. K. Ebblewhite, Coalville, England.

94 **Some Problems in the Use of Rubber Threads in Knitted Textiles.** By W. Davis, University College, Nottingham, England.

41 **Some Problems in the Cable Industry.** By J. Forster and F. Lion, Kabelfabrikund Drahtindustrie, A.-G., Vienna, Austria.

48 **The Use of Rubber in the Manufacture of High-Tension Cables.** By A. M. Jamey, Compagnie Generale d'Electricite, Lyon, France.

84 **High-Tension Rubber Cables.** By H. Heering, Siemens-Schuckertwerke, Kabelwerk, Berlin-Siemensstadt, Germany.

47 **Rubber as a Spring Material.** By K. Oeser, "Getefo," Gesellschaft fur Technischen Fortschrifft m. b. H., Berlin, Germany.

13 **Study of Oil Varnishes Containing Rubber.** By C. Krauz and I. Franta, Institute of Organic Technology, Technical University, Prague, Czechoslovakia.

99 **Rubber Plastics.** By H. Barron, 8 Bishops Court, Chancery Lane, London, W.C. 2, England.

DURABILITY OF RUBBER

2 **Measurement of the Absorption of Oxygen by Vulcanized Rubber in Air.** By A. G. Milligan and J. E. Shaw, Admiralty Engineering Laboratory, West Drayton, England.

31 **Oxidizability as a Test for Determining the Quality of Rubber.** By C. Dufraisse, Institut Francais du Caoutchouc, Paris, France.

32 **Applications of the Measurement of Rubber Oxidizability. Manometric Method: Discussion and Examples.** By C. Dufraisse and J. Le Bras, Institut Francais du Caoutchouc, Paris, France.

26 **The Direct Determination of Oxygen in Rubber. The Adaptation of the ter Meulen Method to Rubber and Its Application to the Study of Aging.** By H. I. Cramer and I. J. Sjothun (University of Akron), and L. E. Oneacre (Firestone Tire & Rubber Co., Akron, Ohio).

103 **The Oxidation Products of Rubber.** By A. van Rossem and P. Dekker, Rijksvoorlichtingsdienst ten behoeve van der Rubberhendel en de Rubbernijverherd, Delft, Holland.

69 **Mechanism of Oxidation of Rubber and Its Bearing on Accelerated Aging Tests. Parts I and II.** By L. B. Morgan and W. J. S. Naunton, Imperial Chemical Industries, Ltd., Manchester, England.

5 **A Proposed New Method of Retarding the Aging of Vulcanized Rubber by Means of Peroxides and Nitro-Compounds.** By S. Minatoya and T. Ando, Heisen Yoko Laboratory, Tokyo, Japan.

104 **Crystallization of Rubber and Its Technical Durability.** By H. Mark, University of Vienna, Vienna.

61 **An Accelerated Aging Test at Room Temperature.** By B. Marzetti, Fabbriche Riunite Industria Gomma Torino, Turin, Italy.

67 **Comparison of Accelerated and Natural Aging Under Various Conditions.** By J. R. Scott, Research Association of British Rubber Manufacturers, Croydon, England.

75 **Aging Fluorescence of Vulcanized Rubber.** By S. Oberto, Societa Italiana Pirelli, Milan, Italy.

52 **Effect of Aging on the Water Absorption of Vulcanized Rubber.** By J. A. Robertson, North British Rubber Co., Ltd., Edinburgh, Scotland.

49 **Methods of Evaluating Durability of Rubber Thread.** By J. P. Griffiths and C. R. Pinnell, Wm. Warne & Co., Ltd., London, England.

37 **Aging Experiments with Latex-Treated Fabrics.** By H. P. Stevens and R. Gaunt, Rubber Producers' Research Association, London, England.

101 **The Aging of Rubber in Relation to Its Textile Applications (with particular Reference to Wool).** By C. M. Blow, Wool Industries Research Association, Leeds, England.

Titles of Papers—Continued

Paper No.

10 **Modern Principles of Preserving Manufactured Rubber.** By M. Combet and C. Vilquin, Etablissements Hutchinson, Paris, France.

27 **Ketone-Amine Products as Rubber Anti-oxidants.** By R. L. Sibley, Rubber Service Laboratories Division of Monsanto Chemical Co., Nitro, West Va.

65 **A Relationship Between the Critical Oxidation Potentials and Anti-oxidant Activity of Rubber Anti-oxidants.** By C. M. Doede, Firestone Tire & Rubber Co., Akron, Ohio.

21 **Effect of Light on Unvulcanized Rubber.** By J. T. Blake and P. L. Bruce, Simplex Wire & Cable Co., Cambridge, Mass.

14 **The Behavior of Rubber at Low Temperatures.** By M. Sagajllo, J. Bobinska and H. Saganowski, Polytechnic Institute of Warsaw, Warsaw, Poland.

15 **Some Properties of Two Vulcanized Pure Gum Compounds at Low Temperatures.** By A. A. Somerville, R. T. Vanderbilt Co., New York, N. Y.

92 **The Testing of Rubber at Low Temperatures.** By J. H. Carrington, Anchor Chemical Co., Ltd., Manchester, England.

12 **A New Approach to the Physical Testing of Vulcanized Rubber.** By J. Behre, Lehmann & Voss Co., Hamburg, Germany.

53 **Fatigue in Rubber. Part II.** By W. J. S. Naunton and J. R. S. Waring, Imperial Chemical Industries.

64 **Dynamic Evaluation of Damping and Durability of Rubber Compounds.** By H. Roelig, I.G. Farbenindustrie, A.-G., Leverkusen, Germany.

87 **The Use of the Pendulum in Rubber Testing.** By F. B. Jones and W. H. Pearce, Dunlop Rubber Co.

30 **A Cutting Test for Tire Tread Stocks.** By T. G. Levi, Societa Italiana Pirelli, Milan, Italy.

76 **The Bursting Form of Test Applied to Rubber and Rubberized Material.** By H. Bradley, British Boot, Shoe and Allied Trades Research Association, London, England.

COMPOUNDING MATERIALS

29 **Manufacture of Blacks of the Carbon Black Type from Materials other than Natural Gases.** By G. Bruni and T. G. Levi, Societa Italiana Pirelli, Milan, Italy.

18 **A Survey of Methods for Evaluating Carbon Blacks.** By I. Drogin, J. M. Huber, Inc., New York, N. Y.

33 **Rubber Vulcanizing Properties of Colloidal Carbons.** By W. B. Wiegand (Columbian Carbon Co., New York) and J. W. Snyder (Binney & Smith Co., New York).

54 **Use of T-50 Test for Evaluating the Rate of Vulcanization of Carbon Gas Black Stocks.** By G. L. Roberts, United Carbon Co., Inc., Charleston, West Va.

55 **Methods of Reclaiming Rubber Employed During the Past Hundred Years.** By P. Alexander, Mommsenstrasse 47, Berlin-Charlottenburg, Germany.

57 **The Incorporation of Polymeric Resins into Natural Rubber.** By R. G. R. Bacon (Royal College of Science), E. H. Farmer and P. Schidrowitz (Rubber Producers' Research Association, London).

PHYSICS OF RUBBER

36 **The T-50 Test for State of Vulcanization. II.** By W. A. Gibbons, R. H. Gerke and G. R. Cuthbertson, General Laboratories, U. S. Rubber Products, Inc., Passaic, N. J.

20 **Mathematics of Water Absorption by Rubber.** By J. T. Blake and H. A. Morss, Jr., Simplex Wire & Cable Co., Cambridge, Mass.

83 **Some Practical Aspects of the Theory of Diffusion of Water through Rubber.** By H. A. Daynes, Siemens Brothers & Co., Ltd., London, England.

17 **Dielectric Measurements in the Study of Carbon Black and Zinc Oxide Dispersion in Rubber.** By A. R. Kemp and D. B. Herrmann, Bell Telephone Laboratories, New York, N. Y.

19 **Dielectric Losses in Rubber.** By C. Zwikker, Institute of Technology, Delft, Holland.

77 **Researches into the Nature and Properties of Hard Rubber.** By B. D. Porritt, Research Association of British Rubber Manufacturers, Croydon, England.

22 **Values of the Physical Constants of Rubber.** By L. A. Wood, National Bureau of Standards, U. S.

34 **Structure of Rubber.** By C. J. B. Clews, University of London, London, England.

35 **An X-Ray Study of Rubber Hydrochloride.** By S. D. Gehman, J. E. Field and R. P. Dinsmore, Goodyear Tire & Rubber Co., Akron, Ohio.

46 **Rubber-Elasticity and Gas-Elasticity.** By H. Mark, University of Vienna, Vienna, Austria.

66 **The Internal Friction of Vulcanized Rubber.** By A. J. A. van der Wyk and K. H. Meyer, Laboratories de Chimie Organique et Inorganique de l'Universite, Geneva, Switzerland.

59 **Static and Dynamic Properties of Rubber Under Compression.** By C. W. Kosten, Rubber-Stichting.

42 **On Rubber Terminology.** By T. R. Dawson, Research Association of British Rubber Manufacturers.

SYNTHETIC RUBBER-LIKE MATERIALS

78 **The Vulcanizing Characteristics of Neoprene.** By Maldwyn Jones, Imperial Chemical Industries, Ltd.

81 **Some Oil-Aging Properties of Synthetic Rubber-Like Materials.** By T. L. Garner and J. Westhead, John Bull Rubber Co., Ltd., Leicester, England.

86 **The Development of Swelling-Resistant Rubber-Like Materials in Germany.** By P. Stocklin, I.G. Farbenindustrie, A.-G., Leverkusen, Germany.

102 **Plastics Having Rubber-Like Properties.** By G. von Rosenberg, I.G. Farbenindustrie, A.-G.

105 **Artificial Materials Possessing Properties of Rubber.** By R. Lepsius, Herbartstrasse 28, Berlin-Charlottenburg, Germany.

40 **The Use of Synthetic Rubber (Buna) as an Insulation for Submarine Cables.** By E. Badum, Felten & Guilleaume Carlswerk A.-G., Koln-Mulheim, Germany.

Titles of Papers—Continued

CHEMISTRY OF RUBBER

Paper No.

6 **Application of Thermodynamics to the Chemistry of Rubber.** By N. Bekkedahl, National Bureau of Standards, Washington, D. C.

90 **Some Remarks on the Photochemical Polymerization of Chloroprene and Some Related Molecules.** By J. L. Bolland and H. W. Melville, Colloid Science Laboratory, The University, Cambridge, England.

91 **Modifications in Rubber.** By E. K. Rideal, Department of Colloid Science, The University, Cambridge, England.

98 **Soluble and Insoluble Rubber. 48th Communication on Isoprene and Rubber.** By H. Staudinger, Chemisches Laboratorium der Universitat, Freiburg i. Br., Germany.

56 **The Interaction of Maleic Anhydride with Rubber.** By R. G. R. Bacon (Royal College of Science) and E. H. Farmer (Rubber Producers' Research Association, London, England).

7 **Cyclized Rubber: Particularly Halide Transformations.** By H. P. Stevens (15 Borough High St., London, S.E. 1, England) and C. J. Miller.

8 **Note on the Extraction of Raw Rubber with Acetone.** By H. P. Stevens and J. W. Rowe.

23 **Mastication of Rubber: A Study of Some of the Oxidation Processes Involved.** By W. F. Busse and E. N. Cunningham, B. F. Goodrich Co., Akron, Ohio.

24 **The Distribution of Combined Sulfur in Vulcanized Rubber and Its Bearing on the Sulfide Linkage Theory of Vulcanization.** By Ira Williams, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

89 **Some Experiments with Accelerators of Vulcanization.** By G. Stafford Whitby (National Research Council, Ottawa, Canada) and H. E. Simmons (University of Akron, Akron, Ohio).

9 **Vulcanization of Oxidized Rubbers.** By H. P. Stevens and F. J. W. Popham.

96 **Contribution to the Problem of the Stabilization of Chlorinated Rubber.** By W. Becker, I.G. Farbenindustrie, A.-G., Leverkusen, Germany.

LATEX

16 **Composition and Colloidal Properties of Balata Latex.** By A. R. Kemp, Bell Telephone Labs., N. Y.

60 **The Composition and Characteristics of the Rubber in Hevea Latex.** By D. F. Twiss and A. S. Carpenter, Dunlop Rubber Co., Ltd., Birmingham, England.

43 **Survey of the Electrokinetics of Rubber Latex.** By E. A. Hauser and M. Bender, Massachusetts Institute of Technology, Cambridge, Mass.

51 **The KOH Number Tests and Its Application to the Compounding of Zinc Oxide in Rubber Latex.** By H. F. Jordan, General Laboratories, U. S. Rubber Products, Inc., Passaic, N. J.

58 **Note on the Mechanism of Creaming of Hevea Latex.** By C. F. Vester, Rubber-Stichting, Delft.

25 **Purified Latex and Rubber.** By R. J. Noble, 21 Woodland Road, Malden, Mass.

72 **Testing and Control of Latex Supplies.** By E. A. Murphy, Dunlop Rubber Co., Ltd., England.

39 **Color Measurement and Its Application in the Rubber Industry.** By W. H. Willott, R. A. B. R. M.

82 **The Testing of Latex Chemicals for Effect of Vulcanization, Solvent Resistance and Fluid Stability.** By C. F. Flint, Imperial Chemical Industries, Ltd., Manchester, England.

38 **The Modification of the Colloidal Characteristics of Rubber Latex.** By C. M. Blow, Wool Industries Research Association, Leeds, England.

85 **The System Latex-Colloidal Clay. II. Further Investigations on the Influence of Colloidal Clay in Rubber.** By A. van Rossem and J. A. Plaizier, Rubber-Stichting, Delft, Holland.

73 **Preparation and Properties of Halogen Derivatives of Rubber from Latex.** By H. C. Baker, London Advisory Committee for Rubber Research (Ceylon and Malaya), London, England.

GENERAL TECHNOLOGY

44 **Problems and Aims of the Control of the Workability of Natural Rubber and Rubber Stocks.** By H. Odenwald and T. Baader, Continental Gummi-Werke, A.-G., Hanover, Germany.

63 **High Speed Apparatus for Determination of Plasticity in Rubber Works and Some Results.** By J. Hoekstra, N. V. Pope's Metaaldraalampenfabriek, Venlo, Holland.

71 **Influence on Final Product of Fast and Slow Vulcanizing Rubbers.** By M. M. Heywood, Firestone Tyre and Rubber Co., Ltd., Brentford, England.

80 **The Applications of High-Frequency Currents in the Rubber Industry.** By H. A. Leduc, 69 Rue de Verdun, Mantes (S. and O.), France.

97 **Ultra-Rapid Vulcanization at High Temperatures.** By R. Thiollet, Societe Anonyme des Matieres Colorantes et Produits Chimiques, Saint-Denis, France.

79 **The Technical Production of Expanded Chlorinated Rubber.** By C. A. Redfarn and P. Schidrowitz, Rubber Producers' Research Association, London, England.

50 **Outline of the Present and Past Work of the Society of the Rubber Industry of Japan.** By T. Yamazaki Sumitomo Electric Wire & Cable Works, Osaka, Japan.

PLANTATION SUBJECTS

1 **Study of the Constitution of Latices in Relation to the Life of Plants.** By E. de Wildeman, Coloniale University, Brussels, Belgium.

62 **Grading Young Rubber Plants with the "Testatex" Knife.** By P. J. S. Cramer, Waldeck Pyrmontlaan 12, Park de Kievet, Wassenaar, Holland.

4 **Tackiness and Consistency of Rubber After Treatment by Alkali.** By O. de Vries, Riskslandbouwproefstation, Groningen, Holland.

93 **Some Problems in Relation to the Production of Latex and Rubber on Estates.** By B. J. Eaton, Brambletye Gate, East Grinstead, Sussex, England.

11 **The Variability of Raw Rubber.** By V. Cayla, Office Technique des Planteurs d'Indochine, Paris, France.

28 **Plasticity and Color of Sheet Rubber.** By J. D. Hastings, Rubber Research Institute of Malaya.

70 **Durability in Connection with Gutta-Percha and Balata.** By H. R. Braak, Government Gutta-Percha Estate "Tjipetir," Java, N.E.I.

Ford Tire Plant

The Cleanliness and Accuracy Typical of Ford Operations, Combined with New Methods, Make the Plant Outstanding

THE world's most advanced tire factory, a $5,600,000 plant embodying scores of departures from conventional tire building methods, has virtually been completed by the Ford Motor Company at its Rouge plant in Dearborn, Michigan. Production is already running at around 4,000 tires a day, although much of the equipment remains to be installed, with an eventual capacity of 18,000 daily.

The cleanliness and accuracy typical of Ford operations are plainly evident in the new tire plant. All the equipment is completely new in design to conform to the company's principles and to the many new manufacturing methods introduced for the first time in this plant. Some of these machines and methods are already in use, and others are expected to be in operation within the next few weeks.

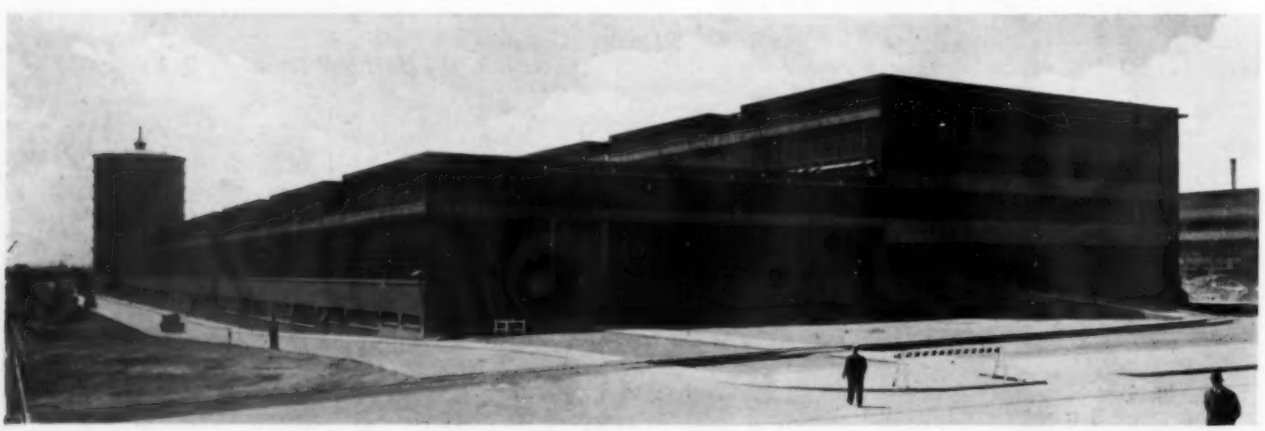
The building itself has many unusual points of design. The structure covers 4.5 acres, has 435,000 feet of floor space, and 70,000 square feet of window glass. This glass is of a special type which filters out the actinic rays of the sun to prevent oxidation of the rubber. Filtered air is provided throughout the building.

According to E. F. Wait, plant manager, the Ford tire at present is being constructed only in the 6.00 x 16 size. It was designed to give long, even wear with exceptional quietness and safety in operation, and has proved these built-in qualities in actual service.

In order to overcome the dust and dirt frequently produced by the conventional mixing methods, the mixing department in older rubber plants is generally separated from other departments and as a rule is rarely shown to visitors. In the Ford tire plant, however, the mixing department is a center of interest, and the visitors' walkway goes right through it. The reason is that it is spotlessly clean. This remarkable cleanliness is obtained by new methods of handling all the various materials used in compounding.

These materials, such as carbon black, zinc oxide, and other compounding ingredients, are automatically weighed and the mixing equipment is automatically operated, the materials being enclosed all the way from the bins into the mixers. This advanced method of handling has another important advantage in addition to the obvious one of cleanliness: It practically eliminates the element of human error in the important chemical compounding operations. As a further safeguard against any error in the operation of the automatic weighing equipment, each batch of stock is properly tested and approved in the plant laboratory before being used in any part of the tire.

Rubber stock being rolled up in cloth for easy handling by tire assemblers in the new Ford tire plant at Dearborn



Exterior view of the new Ford $5,600,000 tire plant which covers 4.5 acres and has 435,000 feet of floor space

After the crude rubber is cut up, and the rubber heated on warm-up mills, it is run through plasticators from which the plastic strip is cut into strips after it emerges and before it proceeds by means of conveyors to the Banbury mixers. The crude rubber cutters and warming-up mills are all located on a second level of the factory where the stocks of compounding materials are also concentrated, handy to both the automatic weighing machines and the hoppers of the Banburys.

The Banburys are twelve in number and arranged in a row 300 feet long on the main floor. They are driven by three 1250 h.p. motors, operated at the power plant voltage of 13,200 volts in order to eliminate losses produced by transforming to lower voltages. These Banburys were especially designed to simplify the handling of the rubber stock. This was accomplished by locating a mill below the mixing compartment. After being properly mixed, which requires about 15 minutes, the batch is dropped directly onto the rolls of the integral mill below. The operation of feeding and emptying the Banbury is automatically controlled by electrical monitoring mechanism.

Special Refrigerating System

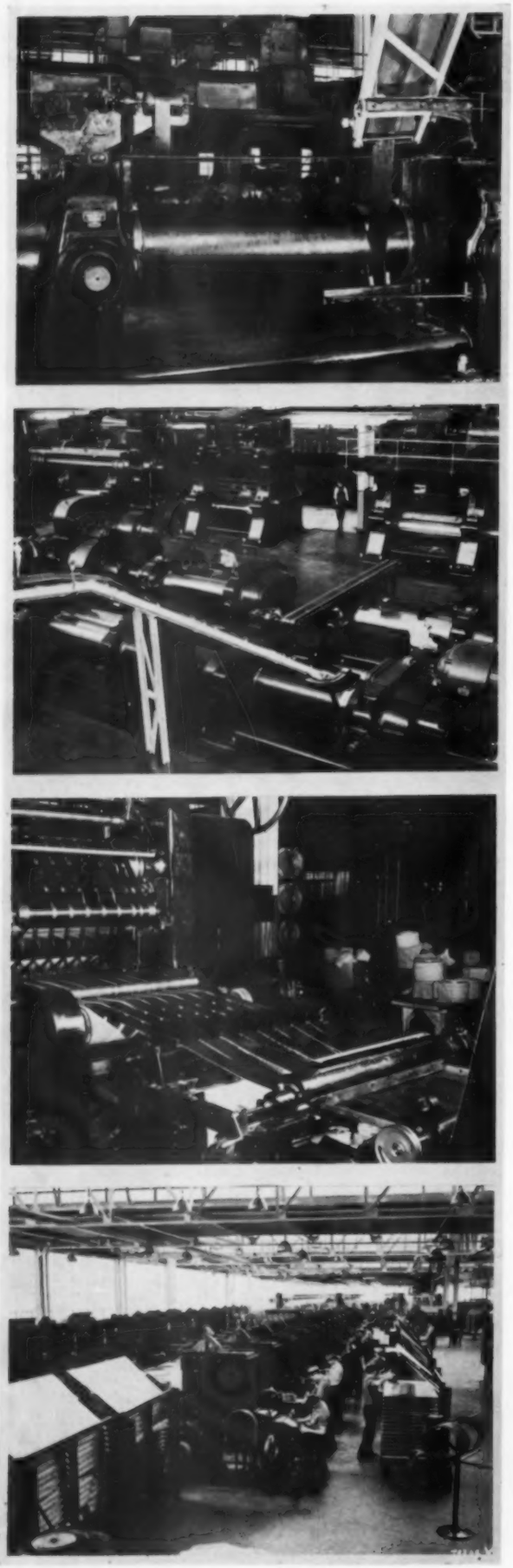
After the batch reaches the mill, it is milled thoroughly, cut into sheets, and hung on racks to cool before going to the next operation. The rolls of the mills under the Banburys and of the twenty separate mills used in the next step of the process are cooled by a continuous stream of water circulated through them. It was anticipated, however, that even this would not be sufficient during the summer to cope with the heat generated by the friction of the rubber, and therefore preparations are being made to install a 1,400-ton refrigerating system in the plant.

This special refrigerating system, which includes the largest single centrifugal refrigeration machine ever built in this country, was constructed by the Carrier Corporation at its Syracuse (N.Y.) plant. It is driven by an 1,185 h.p. motor and will cool 2,500 gallons of water per minute from 65.6° F. to 55° F. when operating at 4,250 r.p.m. The water will be used to remove the heat generated by friction in handling the rubber through the rollers. The refrigerating machine is capable of producing daily cooling equivalent to that given off by 1100 tons of ice.

Two mills are used, back to back, to further mix the batches prior to the extruding operation. The stock is warmed up on one mill and conveyed in a continuous strip to the mill immediately behind it where it is still further milled and then cut into a narrow strip and conveyed overhead to the tread extruder, where it is forced through a steam-heated die to give it the shape desired. It is then cooled and cut automatically into individual tread lengths.

In the meantime, the cord fabric for the plies is also being treated. Currently, the cord fabric is being purchased by Ford, in rolls, in which there are only enough light cross-threads to hold the cords in posi-

RIGHT, top to bottom: (1) A view of the Banburys with balcony in the background where automatic weighing of ingredients is done. (2) Combination Banburys and mills in background; mills in foreground. (3) Calendering cord fabric; view is of early stage after only one side has been coated. (4) Another view of the calender.



tion. The new plant has a creel room in which 3,000 spools of cord will be arranged on spindles. The cords will emerge from the creel room in parallel lines forming a broad sheet without cross-threads. Until completion of this creel room, Ford will continue to purchase its cord fabric in rolls as described. After treatment the fabric moves through a drying chamber and onto reels before it is sent to the calenders.

Coating Is Continuous Process

The calenders, of the most modern type, are capable of coating 60 yards a minute. This operation is a continuous process in the Ford plant, and by means of a gauge every inch of the fabric is weighed as it passes through the calender which enables the operator to know whether or not it is being coated with the proper thickness. After being coated the sheet of cords is then cooled and wound on reels from which it is then conveyed to the bias cutter where it is cut into strips of the desired width and length. These are rolled up for handy use for the tire builders. Breaker strip, chafer stock, and bead fabric are treated and handled similarly.

Building the bead of the tire is largely automatic. The five strands of rust-resistant wire are heated and coated with rubber, and four turns of this—20 strands of wire in all—are quickly wound into a circle the size of the rim of the automobile wheel. This is covered with two layers of bead fabric, a strip of reinforced stock is lapped around it, and the bead is ready for use.

A tire-building machine, the latest type available, is conveniently located near the bias cutter and the rolls of tread stock, carcass, breaker, and chafer stock. After the "green" tire comes off the tire-building machine, the air-bag is placed inside in a specially-built hydraulic shaper, or bagging machine. As the air-bag is inflated the press comes down and the double action enlarges the tread circumference to the required size. This does not stretch the fabric however. It acquires its larger size by the fact that the cords in each layer are pulled more nearly at right angles to their original angle.

The shaped tire, with the air-bag inside, is conveyed to the vulcanizers. Here are long rows of curing molds of latest design, arranged in pairs and automatically controlled. There is no exposed piping. To insure accuracy and to reduce the element of chance, the curing operation is almost entirely automatic. The tire is placed in a mold by the operator, who then pushes a switch. An interval is allowed as a safety factor and then the mold closes. Steam is shot into the air-bag under 180 pounds of pressure. After eight minutes the automatic mechanism turns off the steam and replaces it with 210 pounds of gas. After about forty-five minutes the cure is completed. At precisely the proper minute the mold opens automatically, the tire is removed and taken to the de-bagging machine on a conveyor. The automatic control is supplied by a monitoring mechanism on the balcony of the curing room.

One of the controller devices is an electric time-cycle instrument which times the individual operations by the opening and the closing of cam-operated mercury

LEFT, top to bottom: (1) Tread stock being removed from mill and sent automatically by conveyor to extruder. (2) Another view of tread stock being conveyed from mill to extruder. (3) Slitting cord tire fabric. (4) View of tire building department. These tire-building machines are placed near the bias cutter and the rolls of tread stock, carcass, breaker, etc.

switches driven by a synchronous motor. Each cam is adjustable to permit any desired change in either the starting time or the duration of any operation. A change in the duration of the complete curing cycle is accomplished by changing the frequency of the electrical input to the controllers. Each instrument employs two circuits, i.e., one for driving the timing motor and the other for press operations.

An interesting development in connection with the curing technique is the use of inert gas instead of air in the air-bag in the second phase of the cure. The inert gas is much less destructive to the heavy rubber bag at high temperatures than is air. The Ford engineers have therefore developed a plan to utilize the exhaust gas from four V-8 Ford engines to provide gas for the tire curing bags. The engine gas will be purified and the engines themselves will then compress it to 300 pounds pressure for use in the molds. In that way both the exhaust gas and the power of the engines will be utilized. It is estimated that the curing bags will last approximately twice as long when inert gas replaces air.

Removing the heavy air bags from the tires as they come from the molds is a hot, dirty job in some tire plants. This operation in the new Ford plant is performed by a specially-developed mechanism under the guidance of a single operator. This mechanism presses the tire slightly out of round to spread the beads, inserts a blunt hook, and withdraws the air-bag, the entire operation being completed in a matter of seconds. The tire is then cleaned and given a rigid inspection and a thorough balancing test before it is finally approved for shipment.

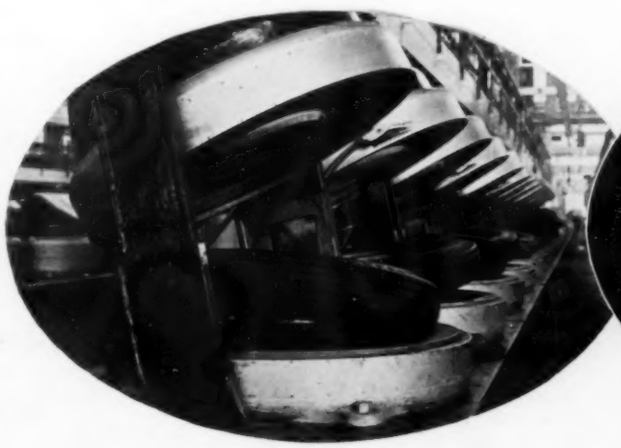
Safety Stressed Throughout Plant

Safety is stressed at every operation in the Ford plant. Driving gears are enclosed in the few cases where the engineers have not yet been able to work out a method to eliminate them altogether. All the machinery is equipped with safeguards of the most advanced type.

Every means have been employed to eliminate drudgery in the factory. Wherever possible materials are moved by an elaborate system of conveyors which reaches into every part of the building. By combining some operations, handling has been reduced and work lightened. The aim of the engineers was to eliminate hard physical work if possible. This has been accomplished to a surprisingly large degree.

Top: "Green" tire being placed in a vulcanizer. Bottom: Tires being bagged and conveyed to molds.

As previously stated, the Ford plant is not yet entirely complete as it stands—the tube department is not in operation, for example, and the laboratory is still lacking in some of the essential testing equipment required in tire and tube factories. From the machinery and equipment installed, and the new methods introduced, however, veterans of the industry who have inspected the plant agree that it represents a great stride forward in tire manufacturing.



Finished tires ready for removal from molds.

One of the final tests, balancing the tire.

A German Process for Production of Sponge Rubber

Four Operations are Involved in Described Method for the Production of Low Density Steam-Cured Sheet Sponge Rubber

By R. R. Olin*

THE following embodies the formulas and a description of the method of processing used by one large German company to produce low density steam-cured sheet sponge rubber. The mixing is divided into four operations. The first operation consists in mixing a solution of gas-producing material. The second mixing is for the purpose of breaking down the rubber, both mechanically and by means of addition of the bulk of the softeners. The third mixing is for the purpose of incorporating compounding materials. The fourth incorporates the gas-producing chemicals into the rubber compound.

The following are typical of the formulation of the four base compounds for these four different operations:

Solution A

Water	25 gallons
Ammonium Carbonate	50 pounds

Compound B

Pale Crepe	44. pounds
Amber Petrolatum	1.75 pounds
Aldol Alpha Naphthylamine (antioxidant)	0.5 pounds
Vulcacit D (D.P.G.)	0.15 pounds
Paraffin	2.85 pounds
Total	49.25 pounds

Compound C

Compound B	49.25 pounds
Zinc Oxide	2.2 pounds
Chalk	41.8 pounds
Magnesium Carbonate	3. pounds
Sulfur	3. pounds
Paraffin Oil	8.35 pounds
Titanium Dioxide	2. pounds
Vulcan Red	0.66 pounds
Vulcan Orange	0.40 pounds
Total	110.66 pounds

Compound D

Compound C	55 pounds
Solution A	35 fluid oz.
Ethyl Alcohol	13 fluid oz.

METHOD OF PROCESSING

A sixteen by forty-two inch mill is used.

Compound B.—The rubber is milled for 30 minutes with the rolls set to form a small rolling bank. Water is circulated through the rolls to keep the mill at ordinary milling temperatures (*i. e.*, about 160° F.). At the end of the 30-minute mastication period, the compounding ingredients are added. The addition of the compounding materials takes about 30 minutes, including the time to cross roll and cross cut, to insure uniform dispersion. This is aged for 24 hours before use in compound C.

Compound C.—The milling of compound C is also in accordance with standard procedure, *i. e.*, the mill is cooled to the normal milling temperature of approximately 160° F. and compound B is allowed to sheet to form a small rolling bank. As soon as the compound is sheeting smoothly, the compounding ingredients are added in the usual way and cross cut and cross rolled to insure uniform dispersion, after which the batch is slabbed off and allowed to cool thoroughly before piling. This compounding operation takes about 20 minutes.

Compound D.—For mixing this compound, the mill is cooled to as low a temperature as possible. The rolls should, under no circumstances during the mixing operation, exceed a temperature of 100° F. The roll opening is such that when compound C is sheeting it forms a small rolling bank. The gas-forming solutions are added as rapidly as the compound will absorb them and the batch cross cut and cross rolled as soon as all of the solutions are absorbed, and the batch is slabbed off. The total time for this operation should not exceed 8 minutes.

Preparation for Curing

The mill is cooled as for mixing compound D, *i. e.*, the roll temperature should not exceed 100° F. Twenty-two pounds of compound D are placed on the mill and allowed to form a sheet on the front roll. The opening between the mill rolls is such that the sheet, when slabbed off, will be approximately one inch thick. The sheet is allowed to roll until free of blisters when the entire sheet is cut off from the mill roll and laid out on a flat table. As soon as initial rapid shrinkage has stopped, sheets 22 x 22 inches are cut out of the slab. The scrap from these sheets is mixed with sufficient additional compound D to make a total of 22 pounds to be sheeted out in the same manner and to be cut into sheets 22 inches square by one inch thick.

As rapidly as possible after sheeting, these 22 x 22 inch by 1 inch thick sheets of compound D are placed in a metal frame the same size as the sheet (*i. e.*, 22 x 22 inches inside dimensions x 1 inch thick). The frame and sheet are placed between one-eighth inch thick metal plates sufficiently large to completely cover the frame and rubber sheet. The frame and rubber sheet and the metal plates are dusted lightly with soapstone or mica before assembly. This assembly is placed in a press cooled with water at 70° F. for 10

(*) R. R. Olin Laboratories, Akron, Ohio.

to 15 minutes. The hydraulic pressure on a press with a fifteen-inch ram should be about 250 pounds per square inch.

Vulcanization

A horizontal cylindrical steam vulcanizer five feet in diameter by twelve feet long may be used for vulcanization. This is equipped with tracks to carry the truck containing the rubber sheets and frames.

A mixture of steam and air is used for vulcanization. Both the steam and air lines are equipped with quick-acting pressure regulators so that the pressure may be adjusted rapidly and accurately. Also, the steam and air lines should be manifolded to one inlet to the vulcanizer between the respective regulators and the vulcanizer. The size of the steam and air inlet pipes leading to the manifold are adjusted to furnish air and steam in the right proportions to uniformly obtain the temperatures specified below for curing. The outlet must be sufficiently large so that the pressure may be reduced in the very short space of time specified below in the description of the vulcanizing cycle. This outlet is, of course, by-passed around the steam trap—the steam trap being of the usual type.

An open rack, mounted on wheels to form a truck which may be rolled onto the tracks in the vulcanizer, is utilized for supporting the sheets during the process of vulcanization. The inside dimensions of the rack forming the super structure of this truck are 38 inches wide by 40 inches high by 130 inches long. The center and each of the end uprights of the rack are tied together by a tier of ten round metal rods one-half inch in diameter and spaced four inches apart vertically from center to center. In addition to stiffening the rack, these metal rods act as supports for the perforated metal sheets carrying the rubber sheet during the process of vulcanization.

Metal sheets about ¼-in. thick and 37 in. wide by 130 in. long are used for supporting the rubber sheets and metal frames surrounding them during vulcanization. These metal plates are perforated with holes approximately one-quarter of an inch in diameter and spaced approximately one-half inch apart on centers. The metal plate is laid on a table and a sheet of light tissue paper laid over it to cover it completely. Three metal frames, the inside dimensions of which are 36 x 42 inches, are spaced equally on the tissue over the metal plate.

This assembly is then lightly dusted with mica or talc. Then a sheet of compound D which has been prepared as described above to a size of 22 inches square by 1 inch thick is centered in each of these metal frames on the dusted tissue which has been laid on a perforated metal plate. The assembly is then placed on the bottom set of horizontal supporting rods in the wheeled rack described above. Nine more plates containing rubber sheets centered in metal frames are assembled as described immediately above and placed in a tier to completely fill the movable rack.

The movable rack is wheeled into the vulcanizer and the door closed. The by-pass around the steam trap on the outlet of the vulcanizer is opened. The regulators on the air and steam lines leading to the manifold attached to the inlet of the vulcanizer are set to 48 pounds per square inch pressure. The manifold valve is then opened and the mixed air and steam admitted to the vulcanizer at such a rate that the temperature of the vulcanizer reaches 270° F. within ten minutes. In the meantime, as soon as relatively dry steam is flowing from the outlet, the by-pass is closed and the outlet exhausted through the steam trap. The temperature of 270° F. is maintained for 46 minutes.

The timing of this next operation is *very important.* The temperature must be reduced from 270° F. to 256° F. in one minute. To accomplish this, the regulators on the inlet steam and air lines leading to the manifold must be adjusted to reduce the incoming pressure from 48 pounds to 30 pounds and the by-pass on the outlet opened immediately and kept open until the temperature in the vulcanizer drops to 256° F. and the pressure from the previous one of 48 pounds to 30 pounds per square inch. As soon as these new lower temperature and pressure conditions are established in the vulcanizer, which should be *within one minute,* the by-pass on the outlet is again closed and the vulcanizer maintained at a temperature of 256° F. for a period of 80 minutes longer. The incoming steam and air are then turned off and the by-pass on the outlet and the vents in the vulcanizer are opened.

As soon as the pressure in the vulcanizer has reached zero, the vulcanizer is opened and emptied. The sheets will be vulcanized and expanded from an original size of 22 inches by 22 inches by 1 inch thick to a size of 42 inches by 36 inches square by 3 inches thick. The original volume of the unvulcanized sheet was 484 cubic inches while the volume of the vulcanized sheet is 4560 cubic inches, *i. e.,* if the processing and vulcanization have been carried on under carefully controlled conditions, the expansion of the vulcanized sheet is on the order of nine times that of the unvulcanized sheet. The cell structure will be round and of a uniform diameter of approximately 3/16ths of an inch throughout the entire body of the sheet. The method of cutting and shaving the skin to prepare these sheets for hand sponges, seat cushions, etc., is conventional.

Production Principles of Interest

It is not believed that any American manufacturers will desire to precisely duplicate this process. However, it is described more as a matter of probable general interest to American sponge rubber manufacturers to outline to them methods employed by foreign manufacturers.

It is believed that some of the principles involved in the manufacture of sponge rubber by this process might be adapted to the methods of production of sponge rubber in this country with some interesting results. For example, the accelerator content is quite low, *i. e.,* just slightly over one-quarter per cent, based on the rubber and softeners. On the other hand, the sulfur content is relatively high—approximately five and one-quarter per cent on the rubber and softeners. The high sulfur content, it will be noted, is compensated as regards protection against bad aging by the use of approximately one per cent of antioxidant on the rubber and softeners. General experience has shown that a proper balance between rate of cure and rate of expansion is very important. This condition appears to be satisfied in this process by the use of low acceleration in connection with high sulfur and very volatile expanding chemicals, and careful control of vulcanizing pressure.

The use of such volatile gas-forming materials as ammonium carbonate, water and alcohol require extremely careful supervision of processing to obtain uniformly satisfactory results. A much safer procedure is to ultilize gas-forming chemicals that do not begin to react at temperatures below those ordinarily encountered in the process of milling, calendering or tubing.

It will be noted that the total vulcanizing time for this process is approximately two and one-quarter

(Continued on page 178)

Charles Goodyear

CONNECTICUT YANKEE AND RUBBER PIONEER*

By P. W. Barker

CHAPTER IV.

First Rubber Manufacture in the United States

EDWIN MARCUS CHAFFEE is a name in rubber history in this country which deserves higher praise than it has ever received. Of early colonial stock, originally Welsh, Chaffee attended only the common schools at South Wilbraham, Massachusetts. In the spring of 1828 he began work in the leather business in Boston, in the employ of John Haskins, and in the spring of 1831 Haskins moved his business to Roxbury, where Chaffee continued his work as a finisher of patent leather.

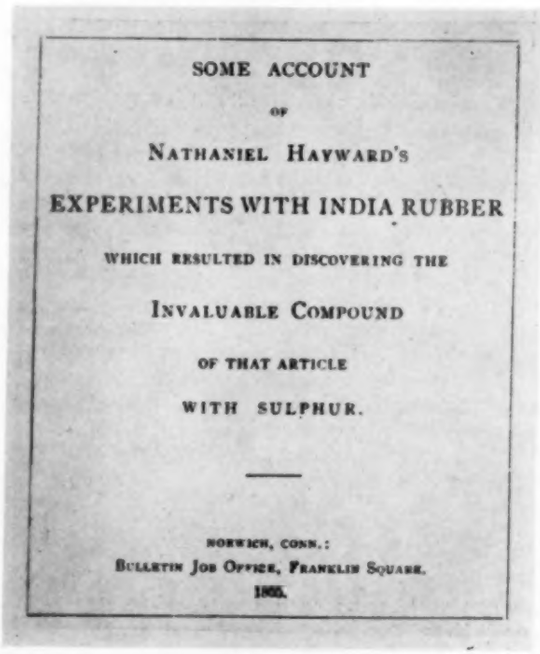
On September 23, 1829, U. S. Patent No. 332 (old system) had been granted to John Rynex, John Haskins, and Samuel Knower, of Boston, for "Improvement in Manufacturing Boots and Shoes, Called the Manufacturing of Perpetual Polished Waterproof Boots and Shoes." This process, the records of which are no longer available, probably was the basis of the method used by Haskins in manufacturing patent leather.

Some time in 1831 Chaffee became interested in experimenting with rubber. Thousands of Brazilian rubber shoes were coming into Boston at the time, and it was common knowledge that the importers were enjoying handsome profits. First experiments of Chaffee embraced the dissolving of rubber shoes and bottles from Brazil in spirits of turpentine. The resulting mixture was applied to cloth. Later he added lampblack.

In 1832 Chaffee invented a "flowing" or spreading machine for applying his rubber solution to entire lengths of cloth, as much as 10 yards in length. One pound of rubber was dissolved in 3 or 4 quarts of turpentine, with lampblack added to give desired color. The machine was merely a box, with openings at bottom, suspended over a roll of cloth which was slowly unwound onto wires stretched from wall to wall. A day or two in the building or carefully spread in the sun was considered sufficient for cure, the turpentine evaporating in that length of time. This method even in its simplicity was far superior to the laborious method of coating cloth with mason's trowels.

John Haskins was an alert business man and he readily fell in with Chaffee's plans for rubber manufacture. Luke Baldwin, of Roxbury, was next solicited and became interested in the new venture, obtaining a building for it on Dudley Street in Roxbury. Spreading apparatus and Chaffee were moved into the building and rubber manufacture was commenced in the utmost secrecy. Doors were locked by day and night, only Chaffee, his younger brother, John Haskins, and Luke Baldwin being admitted. Time was now ripe for promotion.

A few influential citizens of Roxbury were at last invited to view the secret work. They were eager to engage in rubber manufacture; accordingly, a charter was obtained on February 11, 1833, for the first company to be organized for rubber manufacture in the United States, at Roxbury, Massachusetts, the name being the Roxbury India Rubber Factory. Lemuel Blake, Luke Baldwin, Edwin M. Chaffee, and Charles Davis, Jr., were the members of the new corporation; $30,000 was subscribed, and the business was stated as


SOME ACCOUNT

OF

NATHANIEL HAYWARD'S

EXPERIMENTS WITH INDIA RUBBER

WHICH RESULTED IN DISCOVERING THE

INVALUABLE COMPOUND

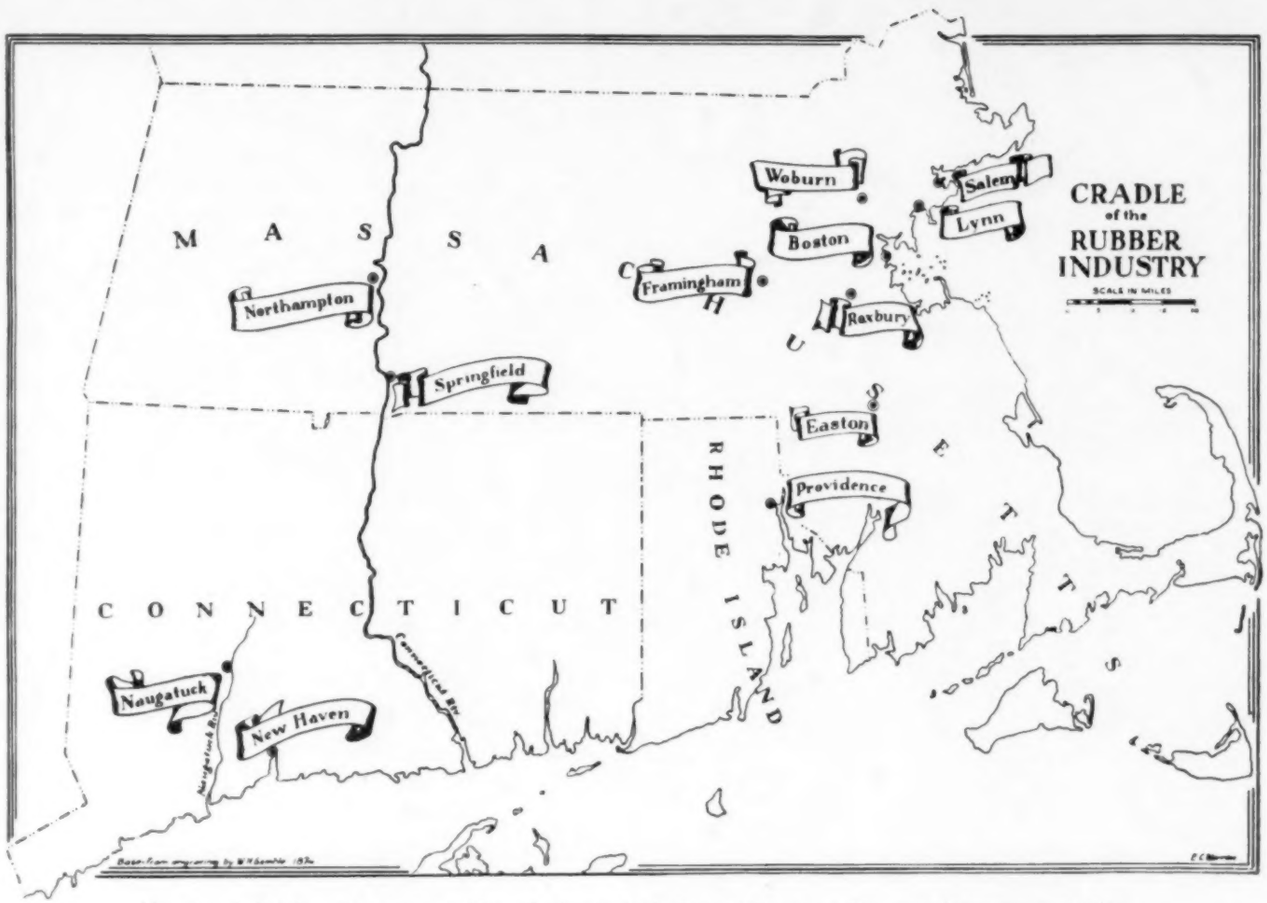
OF THAT ARTICLE

WITH SULPHUR.

NORWICH, CONN.:
BULLETIN JOB OFFICE, FRANKLIN SQUARE.
1855.

Front cover reproduction of Hayward's document.

(*) A continuation of the biography of Charles Goodyear. The introduction and first three chapters of the biography appeared in the April and May, 1938, issues.



Drawing indicating the towns in New England which first harbored rubber manufacturing activities.

"manufacturing india rubber cloth and leather and other india rubber goods." Capitalization was increased to $240,000 in 1834; to $300,000 in 1835; and to $400,000 in 1836. Of course stock was sold!

Affairs of the Roxbury India Rubber Factory prospered in 1833, 1834, and 1835. Stock sold at twice its par value with no lack of purchasers. Those employed by the company were under bond not to reveal secrets of the manufacture, but they were being constantly tempted and some succumbed to bribes—which explains the extension of the rubber business to Boston, Chelsea, Framingham, Salem, and Lynn.

All was not well, however, as those enjoying the confidence of the officials could tell. Goods manufactured and sold did not remain sold. About $20,000 worth of rubber articles, at invoice or wholesale price, were returned for refund in 1835, and $30,000 worth in 1836. Waterproof clothing, caps, shoes, life preservers, wagon covers, and other items had run and congealed by warm weather into an ill-smelling mass and the only possible disposition was by burial, by night, in a deep pit near the factory.

Chaffee Conceives a Solution

But Chaffee, the inventor, had a remedy. His idea was an immense machine, run by power, to force the rubber into the cloth at tremendous pressure, eliminating the expenditure of $50,000 annually on turpentine and other solvents. This machine is pictured and fully described in U. S. Patent No. 16 (present system) of August 31, 1836, granted Edwin M. Chaffee, of Roxbury, Massachusetts. Chaffee obtained $10,000 from the company for his patent which included the machine and accompanying grinders.

The machine was built by the spring of 1837, at Algers in South Boston, at a cost of $30,000, and it weighed 30 tons. Nothing comparable to its size in machinery had ever been made, and the names of "Monster" and "Mammoth" were applied to it. Vital parts consisted of four hollow iron rollers, 6 feet long, placed one above the other and heated by steam. Top and bottom rollers were 18 inches in diameter and the two at the middle, 12 inches. Second roller from the top moved slower than the others, creating a slipping action.

Operation of the "Monster"

Cloth to be coated passed into the machine between the two middle rollers, then down and around the bottom roll. Rubber properly mixed and compounded by the grinders was placed between the top rollers, and thus came in contact with the cloth in a slipping and wiping motion by reason of the different speeds of the cylinders. Steam inside the rollers or cylinders assisted and hastened the entire process. Chaffee personally operated the "Monster," and in his absence Ebenezer B. Scott.

(Today's name for the "Monster" machine is the calender, and it is the same in principle to that of Chaffee but much larger in size. It is about the most useful machine in rubber manufacture. Chaffee must have been inspired when he built it, for it answered the needs of the new industry and probably did as much as the process of vulcanization of Goodyear to make modern rubber manufacture possible. Hancock's "pickle" or masticator was a toy compared to it and did not begin to fulfill its purpose.

(Chaffee's original "Monster" was sold in 1843 for

$525.00 to John Haskins at public auction on failure of the company; in 1844 Charles Goodyear purchased it and transferred it to the Naugatuck India-Rubber Company, at Naugatuck, Connecticut; and when the Boston Belting Company succeeded the Naugatuck India-Rubber Company, the "Monster" continued to work for them until 1890 or 1895, when it was retired. It should occupy the entrance to the Rubber Hall of Fame, if such a hall is ever built).

First American Rubber Advertisements

It is believed that the first advertisement of a rubber product manufactured in the United States was that of Arnold Buffum, who had obtained a patent on December 28, 1822, for "Manufacturing Waterproof Boots and Shoes," which appeared in several issues of the *Columbian Centinel*, of Boston, beginning with the issue of January 10, 1824:

> IMPORTANT TO BOOT AND SHOE MAKERS—The subscriber having discovered a cheap, simple, and effectual method of making the soles of Boots and Shoes perfectly water proof, by inserting between the outer and inner Leather Sole, a Sole of tanned paste board, so thoroughly saturated with gum, that no dampness can pass through it. He has obtained a patent for said improvement, and is now ready to contract to supply Boot and Shoe Makers or others, with any quantity that may be required.
>
> Water Proof Soles, per hundred pair, $10.00
> Do. do. do. per dozen do. 1.50
>
> Orders received and promptly attended to, by Daniel Cobb, Baltimore—Earl & Gaskill, Philadelphia—Calvin W. Howe & Co., New York—Horace Stearns, Boston, or the subscriber in Providence, R. I. ARNOLD BUFFUM, *Patentee.*
>
> N.B. Patent Rights sold on reasonable terms.

Two other advertisements for rubber products appeared at a much later date in Boston newspapers, and it is thought the manufacturer was the firm of Haskins and Chaffee in the first instance and the Roxbury India Rubber Factory in the second. It is definitely known that James Russell was agent for this company, whose charter was not obtained until February 11, 1833.

> WATER PROOF INDIA RUBBER CLOTH SHOES—The subscriber invites his customers to examine a new article of American manufacture, of the above description. This article besides possessing all the elasticity and smoothness of kid, is to be valued principally for being water proof, and is well worth examination. For sale at 93, Washington street (up-stairs) by E. K. Whitaker. (*Boston Daily Advertiser and Patriot*, September 25, 1832).

> INDIA RUBBER WATER-PROOF CLOTH. This very useful article, being impervious to water, can be applied to a great variety of purposes—such as outside garments of every description, for persons exposed to the inclemency of the weather, by sea or land. Gig tops and boots, traveling trunks, interlining for waterproof Boots and Shoes, covering for goods, table covers, nurse aprons, &c &c, for sale at 95 Washington st. (a few rods south of the Post Office) by James Russell, Agent for the Company. (*Boston Daily Advertiser and Patriot*, January 14, 1833).

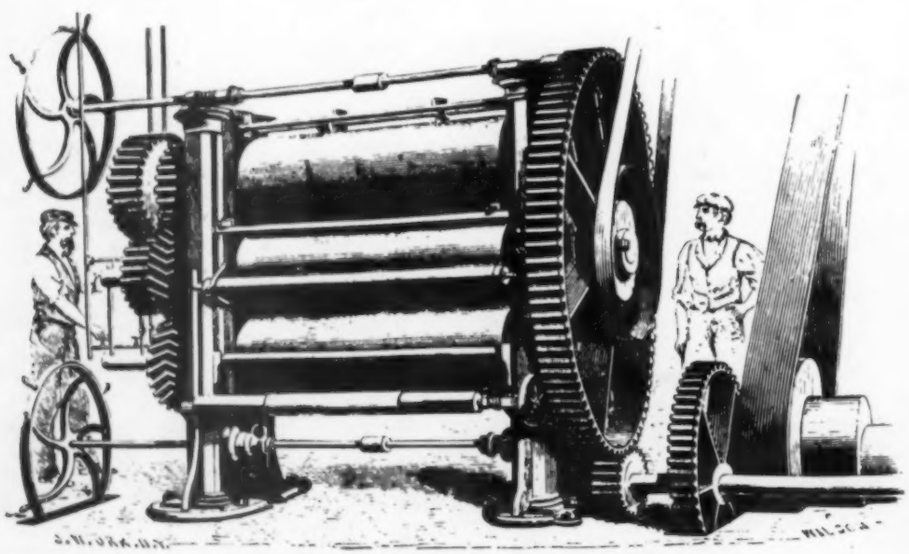
Some of the other products made locally at this time were: (1) India Rubber Patent Tympan Cloth; (2) Patent Elastic Blacking; (3) Waterproof Trusses; (4) Rubber Belting and Steam Packing; (5) Brown's Self-Injecting India Rubber Instruments (*i. e.*, enema); (6) Rubbers; (7) Hydrostatic Beds.

Return of goods, adverse publicity, and general business depression of 1837 spelled the end of the first chartered United States rubber manufacturing company—the Roxbury India Rubber Factory. In 1838 company officials knew the end was near and manufacturing activities practically ceased. The next year saw the finish. Haskins purchased Chaffee's patent on the calender and accompanying grinders for a few dollars (in the fall of 1843) and obtained an extension of the patent until 1857. Rubber goods were desired by the public, but it did not approve of those it had thus far obtained—melting and running together in the summer and cracking with brittleness in the winter. In other words, the stage was all set for the entrance of Charles Goodyear and his process of vulcanization.

Explosion of the Jackson Myth

It is time now for the explosion of a myth. The Roxbury India Rubber Factory was only a few months old when President Andrew Jackson paid a visit of four days to Boston. Accounts have clothed him in rubber garments from head to foot, astride a horse, in a heavy rain, to the plaudits of the multitude and the advertisement of the rubber industry.

Our first Democratic President, the Hero of New Orleans, Old Hickory, did visit Boston. He arrived at the city limits from Roxbury at 4.00 P.M., Friday, June 21, 1833, riding a grey horse provided by Thomas Cordis, Esq., of Roxbury. He remained astride to receive the brief address of the Mayor, dismounted with military grace despite his 66 years, and took his seat beside the Mayor in a gorgeous barouche, drawn



Reproduction of Chaffee's "Monster" Machine, constructed in 1837, taken from Peirce's "Trials of an Inventor: Life and Discoveries of Charles Goodyear." This machine, forerunner of the modern calender, gave considerable impetus to the early rubber manufacturing industry.

by four greys, to follow the military procession to the Common, the bells ringing and cannon firing.

Boston gave him a wonderful welcome. The *Free Press and Boston Weekly Advocate,* June 26, 1833, gives a detailed account of the reception to the President, as well as accounts of his other visits in Boston, almost naming everybody in the processions; but there is no mention of rubber. As to the weather, "There was a moderate fall of rain in the afternoon but not enough to be annoying." Similar silence on Jackson in rubber clothing will be noted in the *New England Galaxy* and the *Boston Recorder,* although Jackson's visit to New England and Boston is given in detail. Mention was made, however, of Jackson receiving a suit of black cloth, Massachusetts-made, and his letter of thanks was reproduced.

Concrete Evidence Decidedly Lacking

To have had advertising value to the rubber industry, surely contemporary newspapers would have mentioned the President's rubber clothing. Parton and Peirce, biographers of Goodyear; biographies of Jackson, including a recent one by Marquis James; Van Buren's autobiography; and Major Downing (Seba Smith), who wrote humorously of the Jackson New England tour, all are silent on rubber. The first dated account of the Jackson rubber story, it is believed, appears in the affidavit of Nathaniel Hayward of December 27, 1864, made at Colchester, Connecticut, entitled "Some Account of Nathaniel Hayward's Experiments with India Rubber which Resulted in Discovering the Invaluable Compound of that Article with Sulphur."

This affidavit is even incorrect as to the date of Jackson's Boston visit, and is as follows: "In the year 1834, General Jackson, then President of the United States, visited New England, and while at Boston was presented with a suit of clothes of this new manufacture, in which dress, on a day somewhat wet, he appeared in public on horseback, for the purpose of reviewing the troops on the Boston Common. This occurrence helped to inflate the bubble, and in a short time the stock of this company rose from one hundred to five or six hundred dollars a share, and every one owning stock in this concern, it was thought, was about to make his fortune."

President Jackson might have worn rubber clothing in Boston, in June, 1833, but it is very doubtful. A rubber suit of clothes, in Boston in June, would have been too hot even for Old Hickory.

Short-lived rubber manufacturing companies at this time were: (1) Salem India Rubber Company, Essex Street, Salem, Mass., from 1836 to 1838, shoes and hats, capitalized at $100,000 but only $2,500 actually paid in; (2) Framingham India Rubber Company, Framingham, Mass., 1835 to 1836, capitalized at $100,000; (3) Eli Robbins, Lexington, Mass., from May to September, 1835, coats and hats, sold for $20,000 to New England India Rubber Company, which failed in 1836; (4) Boston Steam Factory, Pitts Street, Boston, founded by William J. Lovell and Adolphus Stone, from the spring of 1835 to April 6, 1836, when destroyed by fire, making aprons, caps, shoes, clothing, capitalized at $100,000; (5) New England India Rubber Hat Factory, Washington Street, Boston, operating a few months in 1834, making rubber hats covered with plush; (6) Lynn Printing Company, Lynn, Mass., dyers of silk, entered rubber in 1834 and continued until 1837, making rubber-coated cloth, ceased operations in rubber when news of Chaffee's "Monster" machine became public.

Washington, D. C.,
March 4, 1837.

Mr. Charles Goodyear: Dear Sir:

I have received, through General Upton, of the Senate, your note conveying a print on gum elastic, and specimens of the pure gum designed for bandages for wounds and other useful purposes. I thank you for these samples of your skill in the new art in which you are engaged, and which I have no doubt will be found useful in a great variety of ways. I can only wish you success in the prosecution of your useful labors, and assure you that the sentiments of kindness which you express are cordially received and reciprocated by your humble servant.

ANDREW JACKSON

Not all rubber manufacturers of these times were failures. Samuel Steele, operating Samuel Steele & Co., of Woodbury, Conn., made rubber-coated fabrics for table covers as early as 1833. A relative, Ralph B. Steele, followed him in rubber in various cities until he met Leverett Candee and formed L. Candee & Company in 1843. Today these early ventures are consolidated into the footwear division of United States Rubber Products, Inc. Alfred Hale Rubber Company, founded in 1837 by Aaron Hale, is active today at North Quincy, Mass. George O. Bourn and David Winslow established a rubber shoe factory in Providence, R. I., in 1840, which became Bourn & Brown in 1847, became Brown, Bourn & Chaffee in 1851, and in 1861 was known as the Providence Rubber Shoe Company.

There were several attempts at rubber manufacture in the neighborhood of Philadelphia and New York, and John Speakman, of Frankford, Penna., beginning in 1835, was successful for many years, finally becoming inactive. And do not forget a young man, Horace H. Day, of New Brunswick, N. J., who was experimenting with turpentine and rubber as early as 1837 (at which time he was only 14 years of age), according to his later testimony. He will be the defendant in The Great India Rubber Case—Goodyear vs. Day.

Early Manufacturing Attempts Failures

For the most part, however, the early attempts at rubber manufacture were failures. Most writers have overlooked the severe panic of 1837 as being the direct cause of failure and of the inability of investors to further finance rubber companies. Funds lost in these early rubber company failures have been greatly exaggerated, probably not amounting to more than one million dollars of actual cash. The panic of 1837 was world-wide. Stocks were sacrificed at market. Price of cotton hit bottom. Everyone seems to have speculated in land at inflated prices. Banks called in loans, and banks, farmers, and merchants all failed together.

When experts thought the bottom had been reached, the depression deepened. "Starving people paraded the streets of New York and Philadelphia. They broke into stores and warehouses. By September, 1837, nine-tenths of the factories in the East had been shut down. Half the working population of New York lost their

jobs within a few weeks after Van Buren's inauguration." ("A New American History," by W. E. Woodward, 1936).

Another company or series of attempts at rubber manufacture, of short duration, had Nathaniel Hayward as its leader. Beginning in Easton, Mass., in August, 1834, and moving to Woburn, Mass., in October, 1835, with the organization of the Eagle India Rubber Company, Hayward met Charles Goodyear and had his important part in the discovery of vulcanization. Hayward's activities will be treated at length when we resume with the story of Charles Goodyear whom we left in Philadelphia, in 1834, with his mind concentrating on the problems of rubber manufacture.

That Charles Goodyear would be successful goes without saying. His determination of spirit is expressed in these humble words from his autobiography, which was written in the second person: "His anticipations of ultimate success in life were never changed, and his hopes were seldom for a moment depressed." Such a man did not know failure.

(To Be Continued)

Production of Sponge Rubber

(Continued from page 173)

hours. This is divided into two stages. The first stage of approximately one hour comprises that in which the gases are formed within the structure of the rubber compound and during which probably very little vulcanization takes place. At the end of this hour, this internal pressure is released *very rapidly* and the expansion of the rubber compound presumably takes place within the minute during which the pressure is dropped from the higher to the lower stage. Then, due to the fact that the rubber compound has expanded so greatly in volume, the rate of heat transfer from the heating medium into the rubber compound is relatively slow and it is necessary to continue the vulcanization for approximately one hour and a quarter to complete it satisfactorily throughout the volume of the sheet.

The use of properly selected delayed action accelerators should make it possible to very materially shorten this vulcanizing time. It would also seem possible to duplicate, in properly designed molds to be utilized in hydraulic presses, this two-stage process involving: A—the gas forming operation under relatively high mechanical pressure; and B—the subsequent vulcanizing operation under reduced mechanical pressure. In such a process, the use of delayed action accelerators, which, in the latter stages of the cure, develop an exo-thermal reaction, would appear to be very desirable.

Drybrow Sweat Pad

AN improved "Drybrow" Sweat Pad, using sanitary, easily sterilized DuPont cellulose sponge and fitted with a rubber headband, for use by industrial workers, has been announced by the American Allsafe Company, Inc., Buffalo, N. Y. The improved pad absorbs 20 times its weight in moisture, largely eliminates interruptions for wiping eyes and goggles, and contributes to safety by eliminating steamed-up, foggy goggles. Applied moist, it stimulates evaporation with consequent head coolness and comfort, thus relieving heat fatigue. The cellulose sponge resists chemical action of sweat and grease.

New Equipment

Cramer Running Time Meter

A RUNNING time meter (summation) which automatically registers the operating time of the circuit, apparatus or system to which it is connected, and which is driven by a slow-speed, self-starting synchronous motor, has been developed by R. W. Cramer & Co., Inc., 67 Irving Place, New York City. The meter is made in two types, one for registering to-

tal hours and the other for registering total minutes. A five dial counter is used and indicates in 10ths up to 9999.9 and repeats. The dial registering in 10ths is useful for measuring short time intervals and also for verifying the operation of the circuit. The meter is connected in parallel with the machine or apparatus of which the total operating time is to be registered; the synchronous motor starts and runs continuously while the machine or device is operating. The new running time meter, which is housed in molded bakelite, has a wide range of applications, including the recording of actual operating time of processing and production machines, X-ray and diathermy apparatus, textile and paper machinery, and welders. It may also be used for time study.

Vertical Screw Elevator

ENGINEERING problems involved in lifting materials vertically are said to have been coordinated in the development of a new vertical screw elevator recently introduced by Sprout, Waldron & Co., Inc., Muncy, Pennsylvania. The entire load on the helical flights is lifted to the discharge and freed in the new elevator instead of part of it surging past the discharge and spiraling downward to make a circulating load as it does in ordinary vertical screws, according to Sprout-Waldron engineers. Advantages claimed for the new vertical screw elevator include the following: larger capacity and less horsepower; higher lifts possible; can be installed in small space; is dust-tight and weatherproof; no belts, buckets, or chain; can be jacketed to heat or cool material in transit; capacity easily increased or decreased; unloads from any type of car or truck; and provides continuous operation with low maintenance costs.

Who makes grinding mills? The answer to this and similar questions will be found in the Classified List of Rubber Machinery and Equipment in the 1937 RUBBER RED BOOK. Paper-bound copies, $2.00; cloth-bound, $3.00.

Booklets, Catalogs, etc.

Report on Pneumatic Tyred Carts and Other Equipment. British Rubber Publicity Association, 19 Fenchurch St., London, E.C. 3, England. 6 x 9½ in. 16 pp.

The British Rubber Publicity Association has taken over the activities hitherto carried out by the Rubber Growers' Association in connection with propaganda and publicity for rubber products and the development of new uses for rubber. This is the first report under the new arrangement. As indicated by the title, it describes and illustrates various types of rubber-tired agricultural equipment (as used on the University of Reading Farm, at Sonning-on-Thames, in England). The larger portion of the report is devoted to an article on "A Comparison of the Draw Bar Pull of Farm Carts Running on Pneumatic Tyres and Iron Tyres," by J. B. Passmore and M. H. R. Soper.

•

The Limitations of Rubber. IV. Flame Proofing. (Report No. 38-5). By Carl S. Williams. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington, Del. 6¼ x 9¼ in. 12 pp.

Results of tests shown in this report indicate that there is no material or combination of materials having fire retardant properties or of a non-combustible nature that when added to rubber in amounts which permit the resulting product to retain its useful physical properties will retard the burning of rubber to a worth-while degree. Results indicate, however, that it is possible to make practical neoprene compositions having a high degree of flame resistance. Flame retardant materials are named, testing methods for determining flame resistance are discussed, and a bibliography is included.

•

The Influence of the Addition of Rubber on the Properties of Asphalt-Bitumen. By J. G. Fol and J. A. Plaizier. (A Reprint). The Rubber Foundation, 182 Heerengracht, Amsterdam, Holland. 6¼ x 9½ in. 24 pp.

Results of tests on the properties and characteristics of asphalt-bitumen-rubber mixtures obtained from asphalt emulsion and latex, and from asphalt-bitumen-rubber powder, are given in this booklet, a reprint of the article which appeared in the April, 1937, issue of *Wegen*. The authors determined that the addition of rubber powder improves the resistance to cracking and the resistance to penetration of asphalt-bitumen with mineral aggregate, and that the plastic flow of asphalt-bitumen is lessened by the addition of rubber powder.

•

The Use of Rubber in Furniture. Rubber Growers' Association, Inc., 19 Fenchurch St., London, E. C. 3, England. 6 x 9 in. 24 pp.

As the title indicates, this booklet covers the use of rubber in furniture, including seatings, stuffing materials and upholstery fabrics. The history of such use is also covered. Several illustrations are included. The booklet is a reprint of an article which appeared in the September, 1937, issue of the *R.G.A. Bulletin*.

•

More Modern Laboratory Appliances. Fisher Scientific Co., 711 Forbes St., Pittsburgh, Penna. 7 x 10½ inches.

Issued as a supplement to "Modern Laboratory Appliances," a catalog and reference book published by Fisher, this booklet presents equipment and supplies which have been introduced since the publication of the general catalog. It contains many appliances developed by the company.

•

Foxboro Recording Thermometers. (Bulletin 198-1). Foxboro Co., Foxboro, Mass. 8½ x 11 inches. 40 pp.

This catalog, prepared from a non-technical standpoint, contains a brief story on the value of thermometers followed by separate descriptions and illustrations of the thermometers featured by Foxboro. Range characteristics, thermal systems, and special bulbs employed are stressed for each type.

Johnson Friction Clutches Carlyle Johnson Machine Co., Manchester, Conn. 6¼ x 9¼ in. 10 pp.

The standard type of Johnson friction clutch with metal to metal frictions and the Super-Johnson type with Raybestos faced expansion ring are both listed in this new catalog. All recent improvements in the company's products are also listed, as well as several changes in price.

•

Bearings. R. W. Rhoades Metaline Co., Inc., P. O. Box No. 1, Long Island City, N. Y. 8½ x 11 in. 4 pp.

The various types of Metaline oilless bronze bearings marketed by the company are shown in this pamphlet. Diameter specifications are given in table form. A brief description of the manufacture and advantages of the bearings is included.

Book Reviews

Chemistry & Technology of Rubber Latex. By C. Falconer Flint. Published in England. Distributed in the United States by D. Van Nostrand Co., Inc., New York City. 6 x 9 in. 715 pp. $14.00.

(Available from Book Department, THE RUBBER AGE*)*

The increasing importance of latex is evidenced by the growing list of books now available on this subject. The latest addition is Flint's treatise—a book of 715 pages bringing together all of the known facts on latex from sources through properties, preparation, preservation, concentration, compounding, manufacturing uses, testing, etc. The author was formerly with the Rubber Research Institute of Malaya and is now on the staff of Imperial Chemical Industries, Ltd., where he is in charge of research and development work on latex. With this background and experience, Dr. Flint is, according to B. J. Eaton in his foreword to the book, "eminently qualified to be the author of such a publication since he has been in close touch with the raw material . . . and with the preserved product."

Dr. Flint used Georges Genin's book, "Chimie et Technologie du Latex de Caoutchouc," as the framework for his work, but his book is not merely a translation of the French volume, but rather a new book with the latest available information included. Just as Noble's "Latex in Industry"—published in 1936—treated this subject largely from the American viewpoint (at least as far as current practices, materials, and machinery and equipment were concerned), just so does Flint's book lean heavily on British practices. This does not of course apply to patents, for all leading countries are covered so as to give a true picture of latex developments throughout the world.

Flint's book covers the whole subject of latex in a very thorough manner, and with due warnings on the involved patent situation (as treated by the author in his first chapter) it should be found of decided assistance to all technologists and manufacturers desiring the latest available information on the latex situation. The book is well illustrated with charts and diagrams as well as laboratory and factory equipment, and includes many formulas and working details which constitute, according to the author, "a sound basis on which practical experience of industrial latex processes may be acquired either in the laboratory or in the factory." References at the end of each chapter constitute short bibliographies of the more important patents and articles on the various subjects covered.

One point requiring critical comment, in our estimation, is the subject index at the end of the book which seems to be somewhat inadequate. It is rather uncommon to find a major heading in the subject index which is substantially the subject matter of the book itself. We believe that each separate item in the book worthy of being indexed and cross-indexed should have been listed alphabetically regardless of the chapter in which it appears. In Flint's subject index each chapter is listed under one major head with a summary of the contents of each chapter given. It is to be hoped that this situation will be remedied in the next edition of the book.

Editorial Comment

Buffer Pool for Rubber

EVER since the inauguration of the current restriction scheme in 1934, there have been rumors as to the desirability of a buffer pool. Because in its first five years of existence the Restriction Committee has, to all intents and purposes, failed in its objectives, i.e., to reduce stocks to a normal level, to adjust supply to demand, and to maintain a fair and equitable price level remunerative to efficient producers, there has been some strong talk recently in favor of a buffer pool.

The object of a buffer pool for rubber simply adds up to this: the maintenance in consuming countries of a large supply of rubber stock to be released freely when prices are high and doled out carefully when prices are low. In other words, the existence of this stock in various centers of the world would serve to regulate the price of rubber and keep it at a level satisfactory to both producer and consumer. From the latter's angle, the maintenance of a steady price is more important than the price itself (within limits, of course) so that inventories of raw material would not affect the financial position as drastically as they do at present.

There are several methods by which a buffer pool could be created. One would be to force producers to segregate a percentage of export quotas on behalf of the buffer stock with the cooperation of the respective governments. Another would be to purchase stock in the open market with funds obtained by means of a special export duty. Still another would be the formation of a private buffer stock by a syndicate of large consumers, with the approval and cooperation of the Restriction Committee.

There are, of course, several serious obstacles to the promulgation and achievement of any of these plans. Because the market has more often suffered from an excess rather than a shortage of rubber, there is first and foremost the risk that the existence of a substantial stock, whether openly acknowledged or secreted as suggested by some proponents of the plan, would be a depressing influence. Producers would be more affected by such a condition than would the consumers. Second, competition between producer and dealer would inevitably come about with questionable results. Third, and very important, is the question as to who would finance a buffer pool and bear the loss of interest. Some $25,000,000 might be required to accumulate and maintain sufficient stock to have the desired effect.

There can be no doubt that no matter how difficult or how numerous the obstacles to a buffer pool may be, they can be successfully surmounted, if the Restriction Committee, governments, producers and large consumers would cooperate. Strength is given to this statement by the fact that a buffer pool has been operating in tin for many years—and successfully. The fact that producers require a *higher* price on rubber and consumers desire a *regulated* price lends argument to the opinion of many leaders in the plantation industry to the effect that a buffer pool merits the investigation of the Restriction Committee.

Because of the recent action of the Committee in setting up a 45% quota of permissible exports for the third quarter of the current year, there is little chance that any such investigation would be launched before the end of the year.

•

International Conferences

THE long-heralded Rubber Technology Conference, held in London on May 23 to 25, has come and gone. It was gratifying to learn that more than 500 chemists from 18 separate countries attended the Conference, and that over 100 papers were submitted for discussion. The Institution of the Rubber Industry, which sponsored the event, is to be highly congratulated on a difficult job well done.

Although only of three day duration, the sessions of the Conference were so arranged (as explained elsewhere in this issue) that the utmost value was extracted from each short session. Not only will the discussions which took place at the actual sessions be included in the printed Proceedings of the Conference, but delegates were given an opportunity to submit further written contributions to the discussion, and these too will be included. Every rubber chemist should secure a copy of this book, which will be made available shortly.

Continuation of these international conferences is highly desirable. According to the official German delegate at London, a conference similar to the one just held will take place in Cologne in 1940. Perhaps the Goodyear Centennial Celebration planned in Boston in the Fall of next year could serve as the meeting ground for rubber chemists of all nations. A special program, with an international flavor, could be prepared.

CURRENT • NEWS
of the Rubber Industry

JUNE, 1938

LABOR TROUBLES RENEWED IN AKRON

Strikes at Goodyear and Goodrich Are Quickly Settled, Although Riot at Goodyear Plant Results in Injuries to More Than Eighty

Serious disturbances at both Goodyear and Goodrich, both culminating in short strikes, were included among the labor activities in the past month. Firestone and Sun Rubber also figured in the month's news, although the only disturbance assuming drastic proportions was the strike at Goodyear which was marked by riots and violence.

Shortly after the United Rubber Workers of America had declared a strike existed at Goodyear's plants in Akron on May 27, strikers and sympathizers formed a two-deep chain two blocks long to prevent midnight shift workers from entering the gate of Plant 1. Soon after midnight, according to report, the crowd advanced upon a group of city policemen who were keeping the gate open, whereupon the police advanced on the crowd with tear gas and clubs. Approximately 80 persons were injured, including 5 policemen, two of whom were shot. The official strike was called because the U.R.W.A. claimed that it "got nowhere" in negotiations with the management over various claimed grievances.

Union Calls Off Strike

What might have developed into a long and serious situation was terminated on May 30 when members of the Goodyear local of the U.R.W.A. voted to end the strike and return to work, after union officials explained that the company had agreed to take immediate steps to conclude a written agreement with the local, and to discuss overtime and other points at issue with a union committee. The picket line was immediately withdrawn and the workers reported for work on Tuesday morning, May 31, when the plant reopened after the Memorial Day shut-down. Charges of politics, favoritism, and mis-use of authority were made by the union during the short strike.

Earlier in the month the Gadsden (Alabama) local of the union filed new charges of "unfair labor practices" against Goodyear with the National Labor Relations Board alleging that the company was discriminating against union members.

Neoprene in the Aviary

An unusual use for neoprene, the chloroprene rubber made by E. I. du Pont de Nemours & Co., Inc., was recently discovered. It is being used for covering perches and lining nesting boxes in aviaries, the object being to use a material with a hygienic and non-absorbent surface unaffected by continual exposure to weather and sunlight. According to bacteriological experts, the use of so-called synthetic rubber in the aviary is likely to minimize the spread of highly contagious parrot disease which is responsible for many deaths.

Trouble at Goodrich started on May 20 when the Akron plants were closed down in a walk-out which union officials said started as a protest against the retention of eight apprentice electricians while men with longer service were being laid off. Once out, the union demanded a signed agreement, vacations with pay, and the stopping of production work by supervisors and foremen.

This controversy was settled after a week of conferences, in which P. W. Chappell, Federal labor conciliator played a part, when members of the Goodrich local voted to accept a seven-month written agreement calling for continuation of present wage scales and vacations with pay exactly half of that paid last year. The Goodrich directorate ratified the agreement after the union had voted its acceptance.

Other Labor News

The Sun Rubber Company plant in Barberton was opened on May 23 after being shut down for almost three weeks when workers walked out in protest against the installation of a new time study system which they claimed was actually an attempt to introduce wage reductions. Work was resumed after the company agreed to restore the "wage cuts," permit vacations with pay, grant seniority rights, and concede sole bargaining rights to the union, according to officials of the Sun local of the U.R.W.A. E. A. Norris, plant superintendent, said that the agreement was acceptable to both sides.

The contract between Firestone and the U.R.W.A., under which the plant has been operating for the past year, was renewed with minor changes on May 15.

QUOTA SET AT 45% FOR THIRD QUARTER

Regulation Committee Meeting in London Sets Lowest Level Ever Fixed in a Drastic Attempt to Lower Stocks and Raise Prices

The International Rubber Regulation Committee, meeting in London on May 31, fixed the permissible export quota of crude rubber from signatory countries for the third quarter of the current year at 45% of basic allotments. This is a drop of 15% from the 60% which applied to the second quarter of the year and is the lowest export quota point ever fixed, either under the current restriction scheme or the ill-fated Stevenson Plan. No figure was set for the fourth quarter of the year.

Under the 45% quota, permissible rubber exports will amount to approximately 48,572 tons monthly from signatories, in addition to another 8,000 from Siam, French Indo-China and the non-agreement countries. Total supplies, therefore, during the third quarter of this year should amount to approximately 56,000 tons monthly, or 168,000 tons for the period. At the current rate of world consumption, shipments during the third quarter should be considerably under consumption.

Nine-Month Comparisons

The drastic cut in the quota for the third quarter of the year indicates that permissible exports from all agreement territories, including Siam and French Indo-China, will total approximately 566,673 for the first nine months of 1938, an approximate monthly average of 68,797. This would compare with permissible monthly average of 93,333 tons during the first nine months of the previous year. Total exports during 1937 from signatory countries reached a total of 1,119,993 tons, of which 66,000 tons came from Siam and Indo-China.

The quota cut for the third quarter is of course intended to lead to a reduction in world stocks and thereby force the price of crude rubber into higher channels. It is now around 11½ cents. How soon such a reduction will occur depends largely upon the future rate of world consumption. Unless an exceptionally sharp increase occurs in the next few months, observers believe that the surplus stocks now on hand are large enough to prevent any supply shortage for the balance of the year.

NEW YORK GROUP HAS ITS ANNUAL OUTING

Despite inclement weather, with intermittent showers occurring throughout the morning and early afternoon, the outing of the New York Group, Rubber Division, A.C.S., held at Karatsonyi's Hotel in Glenwood Landing, Long Island, N. Y., on Saturday, June 11, was generally voted one of the most enjoyable outings ever held by the group.

Approximately 150 members and guests braved the weather and remained to see a beautiful sunny afternoon and to participate in numerous sporting events. A tasty luncheon was served at 12:30, while an excellent dinner topped off the program for the day.

Golfing honors and prizes went to H. B. McCreary (United Carbon) for low gross and low net, while H. D. Bainbridge (Anaconda) won the kickers' handicap, and S. W. MacKenzie (U. S. Rubber) the high score prize.

An elimination contest featured the soft ball games, played by pick-up teams. After the *Single Men* defeated the *Married Men* by a score of 16 to 15, the *Peddlers* beat the *Chemists* by 16 to 3. In the play-off, the *Single Men* beat the *Peddlers* by 3 to 1 to carry off top honors in the contest. Messrs. Cosler, Jackson, Provost, Shulberg, Vila, Smythe, Eckhardt, Robertson, Hamer and Scoville composed the winning team.

The various events held in the late afternoon and their winners, follow: *Baseball Throw*—M. Wishnick (Continental Carbon) and L. T. de Lorme (Clark Realty); *Fat Men's Race*—M. E. Lerner (RUBBER AGE); *Backward Race*—M. Wishnick (Continental Carbon); *Flyweight's Race*—Fred Conover (U. S. Rubber); *Three-Legged Race*—Charles R. Haynes (Binney & Smith) and H. N. Jackson (U. S. Rubber); *Horseshoe Pitching* — Wm. Lamella (Okonite) and M. R. Buffington (Lea Fabrics); *Boccie*—Ralph Symons (Canada Wire) and M. F. Torrence (DuPont). Two teams of nine members each participated in the tug-of-war, with Messrs. Braun, Lerner, Ottenhof, Scott, Osberg, Eckhardt, Duntze, Rea and Warner composing the victors.

Prizes to All Winners

Prizes to the winners of the various events—bottles of liquor and tins of cigarettes, all supplied by the group itself—were distributed during dinner. C. A. Bartle, chairman of the New York Rubber Group, thanked all the committee members for their work, and called upon two or three of them to say a few words. In answer to Chairman Bartle's question as to whether members and guests preferred the present outing spot to the previous one at which outings have been held for the past three years (*i.e.*, Alps Castle in Preakness, N. J.), there was an overwhelming shout of approval for the selection of Karatsonyi's.

The members of the Outing Committee and their assignments, follow: Charles R. Haynes (Binney & Smith), *chairman;* D. C. McRoberts (Kaysam), *master of ceremonies;* B. B. Wilson (*India Rubber World*) and J. M. Ball (Vanderbilt), *tug-of-war;* H. Bimmerman (DuPont) and S. C. Stillwagon (*India Rubber World*), *soft ball;* W. O. Hamister (Naugatuck), Thos. Callahan (Wishnick-Tumpeer), M. R. Buffington (Lea Fabrics) and W. Lingvoll (U. S. Rubber), *races and contests;* W. F. Lamella (Okonite), *horseshoe pitching;* J. H. Carroll (R. E. Carroll, Inc.), *Boccie;* H. B. McCreary (United Carbon), *golf.*

Coming Events

June 17. Annual Outing, Akron Rubber group, Silver Lake Country Club, Akron.

June 27 - July 1. Annual Meeting, A.S.T.M., Chalfonte-Haddon Hall, Atlantic City, N. J.

July 23. Fishing trip, L. A. Rubber Group, out of San Diego Harbor.

Aug. 19. Outing, Boston Rubber Group; site to be announced.

Sept. 5-9. Fall Meeting, American Chemical Society, Milwaukee.

Sept. 7-8. Fall Meeting, Rubber Division, A.C.S., Plankinton House, Milwaukee, Wisc.

Oct. 10-14. National Safety Congress, Hotel Stevens, Chicago, Ill.

Nov. 4. Boston Group, Rubber Division, A.C.S., Boston.

Akron Group Plans Outing

The annual summer outing of the Akron Group, Rubber Division, A.C.S., will be held on Friday, June 17, this year, at the Silver Lake Country Club. Golf, tennis, baseball, swimming, boating, horseshoes, and other sport activities are included on the program. Free beer will be served on the golf course, while a full course dinner will be served in the evening. Total cost of tickets, including golf and dinner, is $2.50 each. They may be secured from H. V. Powers, secretary of the group, c/o The Goodyear Tire & Rubber Co., Akron, Ohio.

Colloid Symposium Held

The Fifteenth Colloid Symposium, under the sponsorship of the Division of Colloid Chemistry, A.C.S., was held at the Massachusetts Institute of Technology, Cambridge, Mass., from June 9 to 11. Twenty-five papers were presented and discussed. Dr. Ernst A. Hauser, noted latex technologist and a member of the M.I.T. faculty, acted as chairman of the Colloid Symposium Committee. He also presented a paper on "Studies on the Gelation and Filming of Colloidal Clays."

How many rubber manufacturers are there in Trenton, N. J.? A geographical list of rubber manufacturers in the United States is included in the 1937 RUBBER RED BOOK. Paper-bound copies, $2.00; cloth-bound, $3.00.

RHODE ISLAND CLUB ELECTS NEW OFFICERS

Election of officers, a golf tournament, and presentation of the motion picture "Rubber Reborn" featured the Summer Meeting of the Rhode Island Rubber Club held on June 3 at the Wannamoisett Country Club in Rumford, R. I. Approximately 120 members and guests attended the meeting, of which some 70 participated in the tournament held earlier in the afternoon.

The new officers and members of the executive committee follow: *President:* Charles Berlow (American Wringer); *Secretary-Treasurer:* Dave C. Scott, Jr. (Henry L. Scott Co.); *Executive Committee:* E. L. Hanna (Davol Rubber), F. D. Chittendon (U. S. Rubber), Arthur Davis (Goodyear Footwear), S. J. Lake (Respro), John Marshall (Collyer Insulated Wire), Gladding Price (R. T. Vanderbilt), Carl Short (U. S. Rubber), and H. E. Thompson (Anaconda Wire & Cable). F. E. Rupert (Anaconda Wire & Cable) was chairman of the Nominating Committee.

During the meeting, the secretary read the financial report, after which the election of officers took place. The motion picture "Rubber Reborn," which traces all steps in the production of reclaimed rubber as practiced at the East St. Louis (Ill.) plant of the Midwest Rubber Company, previously shown in Chicago and New York, was then shown, after a few introductory remarks by William Welch, president of the company.

Prizes were distributed to winners in the golf tournament. These prizes were made available through the cooperation of the following concerns: Akron Standard Mold Co., American Zinc Sales Co., Anaconda Sales Co., L. Albert & Sons, Ault & Wiborg, Binney & Smith Co., Carter Bell Mfg. Co., Continental Carbon Co., DuPont, William Eggleston & Co., Farrel-Birmingham Co. General Atlas Carbon Co., C. P. Hall, Hallowax Corp., *India Rubber World*, Industrial Paper & Cordage Co., Ernest Jacoby & Co., Monsanto Chemical Co., Moore & Munger, H. Muehlstein & Co., National Rubber Machinery Corp., Naugatuck Chemical, N. J. Zinc Co., Pequanoc Rubber Co., THE RUBBER AGE, A. S. Schulman, Inc., Stamford Rubber Supply Co., William R. Thropp & Sons, Titanium Pigment Corp., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., L. G. Wittemore & Co., C. K. Williams & Co., Charles T. Wilson Co., and Wishnick-Tumpeer, Inc.

Synthetic Rubber Output

Production of synthetic rubber in Germany during 1938 may reach 25,000 metric tons, which would be approximately 25% of all rubber consumed in that country last year, according to a report from the American Consulate at Frankfort-on-Main. There are now two plants engaged in the production of synthetic rubber in Germany. Although the cost is still considerably higher than that of crude rubber, it has been substantially reduced, the report states.

RUBBER DIVISION TO MEET IN MILWAUKEE

The Fall Meeting of the Rubber Division, A.C.S., will be held on Wednesday and Thursday, September 7 and 8, at the Plankinton House in Milwaukee, Wisconsin, in conjunction with the 96th Meeting of the American Chemical Society which will be held during the week of September 5. It has been suggested that members of the Rubber Division planning to attend the Milwaukee meeting make their hotel reservations as early as possible.

Due to the large volume of work handled by Secretary-Treasurer C. W. Christensen, the Executive Committee of the Division has decided to divide the duties of this office. A. R. Kemp, chairman of the Division, has appointed H. I. Cramer, of the University of Akron, Ohio, to serve as secretary until the next election of officers. Mr. Christensen continues as treasurer.

The deadline for receiving papers to appear on the Milwaukee program has been set at July 14. Papers should be forwarded to the new secretary, H. I. Cramer. Those planning papers are urged to communicate as soon as possible with Mr. Cramer so that he can make definite reservation as to the number of sessions needed on the program.

Treasurer Christensen advises that the Executive Committee has authorized the payment of $2.50 each for the following back numbers of *Rubber Chemistry & Technology*, stocks of which are exhausted: Vol. I, No. 1; Vol. II, Nos. 1 and 2; Vol. III, No. 2. Payment of $1.00 each will be made for these; Vol. IX, No. 4; Vol. X, No. 1; Vol. XI, No. 1. Members having extra copies of these back numbers are urged to mail them to Mr. Christensen and payment will be promptly made.

A.S.T.M. MEETING IN ATLANTIC CITY

Seventeen formal sessions are planned for the Forty-first Annual Meeting of the American Society for Testing Materials which will be held at the Chalfonte-Haddon Hall in Atlantic City, N. J., from June 27 to July 1, inclusive. 104 technical papers and reports will be presented. Dr. A. E. White, president of the Society, will discuss "Industrial Research" in his annual address, and will consider various questions affecting research in company laboratories, as well as in the university and related fields.

The Thirteenth Edgar Marburg Lecture will be delivered by Dr. Albert Sauveur, metallurgical engineer and Professor Emeritus of Harvard University. His topic will be "The Torsion Test" and he will describe and discuss a specially built torsion machine made at Harvard. Dr. Sauveur is a charter member of the Society.

Committee D-11 on Rubber Products, through its chairman, O. M. Hayden, will make its report on Friday Morning, July 1, at the Seventeenth Session to be held at the Chalfonte-Haddon Hall. An advance summary of this report follows:

A new method of testing flat rubber belting is submitted for publication as tentative to replace the present standard methods of testing rubber belting used for power transmission. The tentative specifications and tests for friction tape for general use for electrical purposes, and for rubber insulating tape, are recommended for adoption as standard.

Revisions are presented in five tentative standards which include the two specifications for insulated wire and cable, Class AO 30% Hevea rubber compound, and performance rubber compound; and three methods of test for rubber hose, insulated wire and cable, and the general test requirements for rubber products.

A progress report of the activities of the Committee and its Sub-Committees is included as well as a discussion of the standard reference samples having certified abrasion properties that have been made available.

Plan Factory in Sweden

P. W. Litchfield, president of the Goodyear Tire & Rubber Company, who returned to this country on June 6 from a European tour, announced that Goodyear would begin construction of a $1,500,000 rubber factory in Norrkoping, Sweden, in the near future.

Seiberling Tractor Tire

The Seiberling Rubber Company, Akron, has entered the agricultural tire field and has introduced a new farm tractor tire which is said to embody a totally new and different tread design. According to Seiberling engineers, the new tire assures the tractor operator increased mileage, maximum positive traction and efficient and economic performance. Self-cleaning tread, greater draw bar pull, greater flotation, welded carcass and tread, and weather resisting compound are some of the advantages claimed for it. The new tire will be available in 9.00-36, 9.00-40, and 11.25-38 sizes, these sizes covering approximately 80% of the tractor tire market.

Announce New Accelerator

The Rubber Service Laboratories Division, Monsanto Chemical Company, Akron, Ohio, have announced an addition to their line of accelerators. Called "Santocure", the new accelerator is in the same classification as the company's "Ureka" type of accelerators. The major advantage of "Santocure" is said to be in its ease of handling through the plant. It requires a basic accelerator for activation, such as guanidines, aldehyde amines, etc., although combinations of 50% "Santocure" and 50% DPG can be handled with ease in all ordinary factory work.

INSTALL 93-TON VULCANIZER IN GOODYEAR PLANT

A ninety-three ton tank, about as large as a Goodyear airship but weighing 40 times as much, was recently installed in Plant Three of the Goodyear Tire and Rubber Company in Akron. The giant tank will be used for curing the rubber linings that are applied inside other and smaller tanks. When tanks are rubber-lined for various purposes, the rubber, properly compounded and calendered, has to be cemented to the metal and vulcanized. When the tanks with their rubber linings applied are ready for vulcanizing, they are rolled into the new big cylinder on a steel railway and steel doors hermetically seal the heater shut during the time of cure. The reproduction above shows how the big steel cylinder, which measures 45 feet long and 15 feet high, was transported from the local plant in which it was built to Goodyear's tank lining plant. Huge steel truck carriages and an 18-tire delivery truck were used. The huge cylinder was both pulled and pushed along by two trucks, one of which was traveling in reverse gear.

Names in the News

WILLIS GLEED COE, a member of the staff of THE RUBBER AGE, was married in Scarsdale, N. Y., on June 10 to Miss Fern Steig, of Naugatuck, Connecticut. They will reside in Bronxville, N. Y., after returning from a honeymoon trip.

ROBERT COWEN, formerly chief chemist of the Appleton Rubber Co., Franklin, Mass., is now associated in a similar capacity with the Quabaug Rubber Company, North Brookfield, Mass. The latter concern recently erected its own reclaiming plant.

G. M. NAYLOR, manager, crude rubber purchasing division, B. F. Goodrich Co., Akron, has been transferred to Singapore where he succeeds H. C. BUGBEE as managing director of the Goodrich Company (SS), Ltd. The latter will return to the Akron offices.

J. A. MACEWAN joined the Martin Rubber Co., Inc., Long Branch, N. J., on May 21st, where he has been placed in charge of the company's press department.

NORMAN A. SHEPARD, director of technical service, American Cyanamid & Chemical Co., was recently elected a councilor of the American Institute of Chemists. ROBERT J. MOORE, development manager, varnish-resin department, Bakelite Corporation, is president.

HARVEY S. FIRESTONE, JR., vice-president, Firestone Tire & Rubber Co., Akron, acted as official referee of the Indianapolis Speedway automobile race, held in Indianapolis on Memorial Day. He officiated in a similar capacity in 1932.

DR. H. L. TRUMBULL, manager, chemical research, B. F. Goodrich Co., Akron, has been appointed a member of the committee for improving the professional standing of the chemist recently organized by the American Chemical Society.

D. S. VILLARS, who has been stationed at the U. S. Rubber Plantations in Sumatra for the past three years, has been transferred to the General Laboratories in Passaic, N. J.

HERMAN A. PFEIFER has been named New England representative for the Titanium Pigment Corporation, with headquarters in Boston. At one time he was a sales engineer for the American Cyanamid & Chemical Company, and more recently was associated with the Bisbee Linseed Company.

J. B. HANAN, staff superintendent, B. F. Goodrich Co., Akron, was elected president of Phi Sigma Alpha, scholastic honorary fraternity founded at Akron University in 1910, last month. He is also a trustee of Kent State University.

Secures Honorary Degree

An honorary degree of doctor of laws was conferred on William O'Neil, president of the General Tire & Rubber Co., by Holy Cross College at the annual commencement exercises of the college in Worcester, Mass., on June 8. Presentation of the degree was made by Governor Hurley of Massachusetts. Mr. O'Neil was graduated from Holy Cross in 1907. Three of Mr. O'Neil's brothers are also Holy Cross graduates, while three of his sons have been awarded bachelor's degrees by the college. A fourth son is now an undergraduate.

ELMER O. KRAEMER, DuPont research chemist, has been awarded a research fellowship for $2,500 by the Lalor Foundation for the study of the sizes and shapes of giant molecules, such as rubber, cellulose, etc., in the laboratories of The Svedberg at the University of Upsala in Sweden.

CASPER SMITH, president, Smith Chemical & Color Co., Brooklyn, N. Y., is reported recuperating from injuries sustained in a recent automobile accident. He is expected to return to the office shortly.

M. L. DAVIS, engineer, Firestone Tire & Rubber Co., Akron, was elected president of the Akron Society of Professional Engineers, at the annual meeting of the Society held in Akron early last month.

HERBERT STANDRING, founder and publisher of *The Rubber Age* of London, has retired. He may be reached at 16 High View Close, London, S.E. 19, England. G. S. RANSHAW is now publisher and editor of the rubber journal.

RALPH REEL, chief chemist, Pharis Tire & Rubber Co., Newark, Ohio, was the guest speaker at a meeting of the Zanesville (Ohio) Exchange Club held on May 20. He reviewed the history and development of the rubber industry.

V. L. WANSELOW, formerly truck and bus tire manager in the Chicago district for the B. F. Goodrich Company, has been promoted to the western managership of the national accounts sales division. He succeeds C. W. WACKER who recently was transferred to Detroit as manufacturers' sales representative.

HERBERT A. ANDRES, who resigned from the research and new products development division of the Goodyear Tire & Rubber Company last October to become vice-president of the New Hampshire Diatomite Co., Portsmouth, N. H., has been made president of that company.

CRUDE RUBBER TYPES REVISED BY R.M.A.

The Crude Rubber Committee of the Rubber Manufacturers Association, in cooperation with the Rubber Trade Association of New York, has revised its crude rubber types. The new types will become effective on August 1 and will supersede the present types which have been in effect since October 4, 1929. Distribution of the type samples to manufacturers who have placed orders was begun two months ago. The type samples may be secured from the R.M.A. at $5.50 per sample, F.O.B., New York.

Printed descriptions of the new official crude rubber types, including several for which physical samples have not been prepared, are contained in a new bulletin entitled, "Crude Rubber Type Descriptions and Packing Specifications for Crude Rubber." Copies of this bulletin may be secured without cost from the Rubber Manufacturers Association, by addressing a request to its offices, 444 Madison Avenue, New York City.

The new crude rubber types cover various grades of ribbed smoked sheets, thick and thin latex crepes, thick and thin brown crepes, thick and thin remilled crepes, etc. The R.M.A.'s standard packing specifications for crude rubber are by reference made a part of the quality or type descriptions. They cover the same grades of rubber.

In announcing the promulgation of the new crude rubber types, R. H. Goebel, secretary of the Rubber Manufacturers Association, said: "We wish particularly to direct the attention of all rubber manufacturers to this important step forward in the crude rubber quality standardization program of the Association and to recommend its general adoption. We feel certain it will be in the best interests of the industry if all crude rubber purchases are made on the basis of these types."

Sears Cuts Tire Prices

Sears, Roebuck & Company have reduced prices on their mail order tire lines from 8 to 14%. The reductions are shown in the company's summer "flier" catalogs recently placed in the mail. The reductions, applying only to the All-State brand sold by Sears-Roebuck through the mails and not to the company's retail stores, are not expected to have any effect on the industry's price structure.

To Close Firestone Mills

The Firestone cotton mills at New Bedford, Mass., are to be closed for a three-month period at the end of June, according to word from Akron. Most of the stock now in process is expected to be finished by the end of this month. Action is said to have been prompted by curtailment of production in the automobile industry and by large reserve stocks of tire fabric.

ADVERTISING PAGES REMOVED

Celebrate One Hundredth Anniversary of the Hodgman Name in the Rubber Industry

The current year marks the one hundredth anniversary of the Hodgman name in the rubber industry. In 1838, one year before the discovery of vulcanization by Charles Goodyear, Daniel Hodgman sold his first rubber product under his own name.

Daniel Hodgman was born in a little New Hampshire village, spent a few years in farm work, later opened a thread and needle store in Roxbury, Mass., on his own, set out for New York City in 1835 where he worked in William Atkinson's rubber factory, and three years later, in partnership with a young man named Robinson, opened a store in Beaver Street, New York City, for the sale of rubber goods at retail.

Early Rubber Products

About one year after the firm had been founded, young Robinson became discouraged and the partnership was dissolved. Shortly thereafter, Daniel Hodgman took a larger store on Maiden Lane and branched out into manufacturing as well as merchandising. Among early products were "rubber pants," now known as industrial waders, overshoes, and life preservers. A medal was awarded this pioneer rubber manufacturer for a new type of life preserver he devised at the Fair of the American Institute, held in New York, in October, 1839.

The domestic rubber industry, of course, received impetus after Goodyear's discovery of vulcanization. Goodyear issued licenses for the manufacture of various types of rubber products to different manufacturers. One of these licenses—for rubber door springs—was assigned to Daniel Hodgman. The original license was assigned to Hodgman at a cost of $2,000 by Mr. H. B. Ames, but later Hodgman made a direct contract with Goodyear on a royalty basis. About this time the celebrated California Gold Rush occurred, and Daniel Hodgman sold hundreds of rubber knapsacks to enthusiastic prospectors. Each of these knapsacks had the Hodgman name on them in big, bold letters, and it is probable that national recognition was first secured for the company in this manner.

Factory Moved to Tuckahoe

In 1853, Mr. Hodgman moved his factory to Tuckahoe, New York, the purchase price of $10,000 giving him not only a large stone cotton mill but a larger portion of land which is now occupied by the village of Tuckahoe. World developments in the next three decades, including the Crimean War, discovery of oil in Pennsylvania, laying of the first Atlantic cable, completion of the first transcontinental railroad, all contributed to an increasing demand for rubber products, with the result that Hodgman added many new items to its line and expanded accordingly.

Following the death of Daniel Hodgman, some time after the Civil War, his two sons, both of whom he had individually trained, took over the business, Charles A. Hodgman becoming the manufacturing expert, and George F. Hodgman assuming the business responsibilities. Under the latter's hand, the business entered a new era. In 1879 the store was moved to 425 Broadway, and in 1882 a new factory was built in Mount Vernon, N. Y., for the exclusive manufacture of raincoats and mackintoshes.

In 1885, on George Hodgman's insistance, the company was placed under the corporate form of ownership and control and the business was duly incorporated under the name of the Hodgman Rubber Company. In 1903 the New York store was again moved, this time to 806 Broadway, near 11th Street, where it remained for over twenty years.

In 1906 Charles A. Hodgman became president after the death of George. Ill health forced the former to relinquish the office after three years, however, and the Hodgman Rubber Company passed into the hands of the third generation of Hodgmans, *i.e.*, George B. Hodgman, son of George F., was named president; his brother, S. Theodore, became treasurer; and F. A. Hodgman, son of Charles, became vice-president. A. W. Warren, who had been with the company for many years and had risen to the post of general manager, was retained and entrusted with the direction of manufacturing and selling.

Modern Era for Company

By 1913 the Tuckahoe factory had grown to a five-story reinforced concrete building. The company was then dealing in a wide variety of raincoats and rubber surface clothing, air specialties, rubber bands, molded goods, and rubberized fabric. What may be termed the modern era in the Hodgman history began the following year, in 1914, when the World War broke out. For the next several years, the company was actively engaged in furnishing "slickers" or raincoats to the army, as well as sterilizing bags and gas mask fabric.

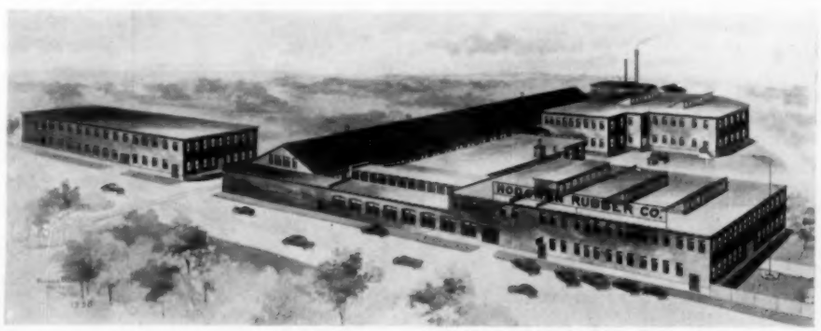
About 1925 some changes occurred in the old Hodgman Rubber Company. A revised organization was set up with Mitchell Kaufman, well-known rubber executive, as president and general manager, and activities were removed to Massachusetts. Following Mr. Kaufman's death in 1930, Albert H. Wechsler, long associated with him, became president, and Max I. Woythaler was appointed treasurer and general manager. Both of these executives still occupy the same posts.

Present Status of Firm

The present business operated under the name of the Hodgman Rubber Company, at Framingham, Mass., actually consists of three separate divisions, *i.e.*, Rubberized Fabrics, Sporting Specialties, and Sundries. The first division not only coats all kinds of fabrics to the specifications of other manufacturers and converters, but also makes several well known trade-marked products. The coated fabrics go into the manufacture of raincoats, ladies' handbags, billiard table materials, ping pong bats, and other common and unusual products. The second division (Sporting Specialties) produces fishing waders, fishing shirts, sports clothing, hunting suits, and air mattresses, as well as various kinds of industrial garments such as protection suits used by firemen, gas workers, and airplane mechanics. The Sundry division makes rubber bands, sterilizing bags, diving dresses, and many extruded items to specific requirements under contract.

In addition to Mr. Wechsler and Mr. Woythaler, executives of the present Hodgman Rubber Company include the following: Charles M. Davidson, division manager, rubberized fabrics; C. Weare Howlett, division manager, sporting specialties and sundries; J. A. Johnson, factory manager; Joseph L. Haas, technical superintendent; and S. F. Ryan, auditor and credit manager. Offices and display rooms are maintained in New York City and Chicago, in addition to the factory.

Note: Last year the Alfred Hale Rubber Company, North Quincy, Mass., passed its first 100-year mark. Its history was published in our January, 1937, issue.



View of the Hodgman Rubber plant in Framingham, Massachusetts.

NEW ENGLAND

Firestone Tire & Rubber Co. is equipping its new plant at Fall River, Mass., for the production of the Controlastic yarns made from latex. The plant has both rail and water facilities, and latex from the Firestone rubber plantation in Liberia and from other countries can be delivered direct on the dock. The yarns will be offered in varying degrees of fineness to meet all the specific requirements of elastic garment production, and will be available in both cones and skeins, covered or uncovered.

A. G. Spalding & Bros., Chicopee, Mass., returned to a five-day schedule in two departments during May, with a 40-hour week in effect for 250 of the plant's 1,200 employees. The departments affected are the golf and tennis ball units. Other departments were continued on a 30-hour basis.

Kerite Insulated Wire & Cable Co., Seymour, Conn., has awarded contracts for a new factory building, two stories in height, of mill construction, 130x54 feet.

Earnings of Norwalk Tire & Rubber Co., Norwolk, Conn., for the six months ended March 31, 1938, amounted to $39,217 after depreciation, taxes, and other deductions, compared with $42,917 for the corresponding six months period.

George L. Burke, formerly chief engineer for the Rubbercraft Corp., New Haven, Conn., and previously a consulting engineer in New York City, has been appointed deputy commissioner of public works for the State of Connecticut. He will be chief assistant to Commissioner Robert A. Hurley.

While Fisk Rubber Corp., Chicopee Falls, Mass., has introduced a new third-line tire, Fisk "75," to meet competition, the company is on record through its president, Col. Charles E. Speaks, as disapproving these low-priced lines. In a letter to 146,000 agents throughout the United States, Col. Speaks said:

"I do not believe either the tire dealer or the consumer needs these new lines. Tires now on the market already meet all requirements of both price and quality buyers. New additions are only competing with existing lines, needlessly increase inventories, and add nothing to the fundamental soundness of the trade situation, either to the dealer, to the consumer, or, in the final analysis, to the manufacturer."

Fisk employed an average of 1,742 persons in 1937, paying them a total of $2,788,000 in wages, George E. Conlin, cost accountant for the company, told the Springfield Chapter of the National Association of Cost Accountants during a visit to the plant on May 25. The visiting group, made up of about 50 accountants, inspected the plant and were entertained at dinner in the Fisk dining room.

To Review Goodyear Case

In a decision handed down on May 16, the United States Supreme Court ordered the Federal Trade Commission case against the Goodyear Tire and Rubber Company, charging price discrimination, returned to the Sixth Circuit Court of Appeals, Cincinnati, for further proceedings and a "determination of the merits." The court decreed that the case has not become moot, as claimed by Goodyear in view of the fact that it had voluntarily cancelled its alleged discriminatory contract with Sears, Roebuck & Company and passage of the Robinson-Patman Act did not remove the right of either Goodyear or the Federal Trade Commission to have the order reviewed. The continued court case is now based on legal technical grounds, the government agency's object being to have the Federal courts sustain its own decision.

Named Pocono Trustees

Benjamin Haber and J. A. McQuillen have been named permanent trustees of the Pocono Rubber Company, Trenton, N. J., by Judge Philip Forman of the U. S. District Court. Both had been serving in temporary capacities. Herbert W. Backes, counsel for the trustees, recently reported that the company had been making considerable progress under its reorganization set-up, with monthly losses being steadily reduced. He predicted that Pocono would begin to show a profit in the near future. The company applied for reorganization under Section 77b of the Bankruptcy Act several months ago.

Standardize Tire Sizes

Negotiations on standardization of tires between rubber manufacturers and automobile manufacturers in Germany have been concluded, according to report. In the future there will be only 10 sizes made for passenger cars instead of 37 as formerly. The standard tire, according to the negotiations, will be the 16-inch, with a 20-inch for light vans, and a 22-inch for heavy trucks.

Starts Reclaiming Plant

The Quabaug Rubber Company, North Brookfield, Mass., expects to get its recently installed reclaiming plant in operation some time this month. When in full operation, the plant is expected to have a capacity of approximately 200,000 pounds of reclaimed rubber monthly. Quabaug manufactures soles, heels, rubber tile, matting, stair treads, and other products.

FINANCIAL

Raybestos-Manhattan, Inc.

First Quarter: Net loss of $171,448, after all costs and expenses, including provision of $188,572 for depreciation. Net sales amounted to $3,595,454 as compared with $6,563,188 in the first quarter of the previous year. The company reported a profit of $674,504 for the first three months of 1937. Directors declared a dividend of 15 cents per share payable on June 15 to stockholders of record on May 31, 1938.

United Shoe Machinery

Year Ended February 28: Net income after taxes and including income of $4,037,963 from associated companies, interest and other dividend income, amounted to $10,146,152, equivalent to $4.24 per share of common stock after deduction of preferred dividends amounting to $421,235. Profit before provision of $1,308,000 for Federal income tax amounted to $11,454,152.

United Carbon Co.

First Quarter: Net profit of $438,364, after Federal income taxes, depreciation, depletion, and other charges, but before surtax on undistributed profits, equal to $1.10 a share on 397,885 no-par shares of common stock. This compares with a net profit of $722,368, or $1.81 a share, in the first quarter of 1937. Current assets as of March 31 were reported at $3,679,115, including $1,451,784 in cash.

A. G. Spalding & Bros.

Quarter to April 30: Net loss of $128,648, after all charges including amortization, which compares with net loss of $287,473 in the preceding quarter and a loss of $52,680 reported for the corresponding period last year. Net sales for the quarter reported on were $3,387,400, against $3,978,785 in the corresponding period of 1937.

Lee Rubber & Tire

Six Months to April 30: Consolidated net profit of $314,105, after all charges including the surtax, equal to $1.23 each on 255,565 shares of $5-par capital stock excluding shares in the treasury. This compares with reported profit of $473,277, or $1.83 a share on 257,465 shares for the six months to April 30, 1937.

Seiberling Rubber Co.

Year Ending October 31: Net loss of $10,444, contrasted with net profit of $103,385 in the previous year. Company places loss largely on write-down of inventory.

LOS ANGELES NEWS

The Finance Credit Union at the B. F. Goodrich Company, now in its 27th month, has a membership of 450 employees of the company and members of their families. Dividends paid on shares have averaged 6 per cent to date. Assets which have increased $5,000 in the last few months now stand at $15,000. Since its organization, the Union has loaned $39,000 and to date has collected $27,000. A 10 per cent reserve is being maintained in place of the required minimum of 5 per cent because of current business conditions.

F. S. White, treasurer, reports that hundreds of men have been helped through emergencies with fine savings to them and with no loss to the treasury. This Finance Credit Union has set $500 as the maximum amount that any one person can invest in shares. Its growth continues rapidly, according to Mr. White.

The spring sales conference held May 11 and 12 at the Samson plant of U. S. Rubber Products, Inc., was attended by 150 independent dealers. Lunch was served at the plant and the problems of the dealerships presented and discussed. While business on the whole was reported below earlier expectations, a spirit of optimism prevailed.

The Armstrong Cork Company has practically completed its new plant located near the intersection of Atlantic and Firestone Boulevards. The plant is located in healthful surroundings at the eastern limits of the Los Angeles industrial district and is modern in every detail.

Rubbercraft Corporation of California has completed the installation of its sixteenth press in its plant at Torrance and a very large press built for a special purpose is to be installed within a few weeks. C. N. Merralls, president, reports that the plant is running a double shift to keep up with its work and prospects for an active summer are good.

T. Kirk Hill, president of The Kirkhill Rubber Company, is now on a tour of the West Indies and countries of the northern section of South America, and will not return to Los Angeles until the middle of July.

T. N. Merralls, vice-president of Rubbercraft Corporation of California, was married recently to Miss Jean Teague of Beverly Hills. The couple plan a tour later in the year.

On May 30 the B. F. Goodrich Company plant completed its 276th consecutive day without a lost time accident in the entire plant. Individual teams in the three team safety contest, however, had even a better record than this. Team No. 1 had 276 days to its credit; Team No. 2, 781 days; and Team No. 3, 368 days. This is the best safety record made at the plant since 1933 when a record of 491 no-lost-time accident days was achieved, the period starting late in 1931. Stimulative of interest in the present three team contest are three pennants on the great flag-pole at the plant. In case of an accident the white pennant comes down and a red one goes up, the latter remaining up for one week. Another feature is the presenting of congratulation cards on no-accident records by foremen to individuals on their employment anniversaries. This plan gives the foreman a chance to contact each employee individually during the year and to talk safety methods to him.

Announcements have been mailed out to all members of the Los Angeles Rubber Group concerning the deep sea fishing excursion out of San Diego harbor on Saturday, July 23, and it seems likely that the full quota of fishermen will sign up for the trip, according to Ed Royal (of the H. M. Royal Company) who is in charge of plans.

The monthly foremen's event for the foremen's group at the Samson Tire and Rubber Corporation will be held on June 24. This will be an outing at Balboa Island. Forty-two men are expected to make the trip. At the May 27 meeting the entertainment feature was a demonstration of fancy pistol shooting by Officer Carr of the Los Angeles police force, champion pistol shot of America, assisted by Officer Gilmore, also one of the country's leading pistol shots.

The Goodrich Employees' Recreational Association which has completed its records in detail for its fiscal year which ended April 1 reports that the association sponsored 239 different activities for the year with a total attendance of 3,564. Among the outstanding events of the year was the banquet by the Rod and Gun Club with an attendance of 154. The Rod and Gun Club has chartered a vessel for its annual deep sea fishing trip out of San Diego harbor on June 25. The Soft Ball Club has completed work on the diamond and has it ready for an active season. J. A. Clark is director of the association.

The entire executive force and all employees of the executive offices of U. S. Rubber Products, Inc., Samson Division, were present at ceremonies on May 20 when Montebello Township officials signed the scroll in front of the company's plant inviting Californians to attend the World's Fair at New York in 1939. The occasion was the visit to the plant of the courier car sent out by the New York World's Fair, Inc., to California. The car is one of the forty-nine cars, all equipped with U. S. Rubber tires, which are being sent this year to each of the forty-eight states.

Following the ceremonies the visitors, together with the township officials, were entertained at a luncheon at the plant where a brief program was staged. M. A. Quirk, personal director, was in charge of the details. This was one of the largest events of the kind staged at the plant in several months.

Group in front of the Samson plant (see story). B. F. Schleicher, vice-president, F. S. Carpenter, factory manager, and C. L. Remy, assistant factory manager, of Samson, will be recognized among the group.

Organize Lithox Corporation

The Lithox Corporation has been organized, with factory and headquarters in Wapakoneta, Ohio, for the manufacture of "Metal Flex" soles and heels, "Lithox" soles and heels, and "Lithox" sheet material. The corporation was founded for the purpose of manufacturing products sold by the S & K Rubber Company, well known in the shoe trade by these soles and heels. The "Lithox" process of making soles and heels features a combination of a special tread with tire cord as the base to prevent spreading and bulging, so that the sole does not become ragged when worn. Officers of the new corporation are A. F. Smith, president; R. S. Kimball, vice-president; Edward Johnson, treasurer; and W. G. Montgomery, secretary.

Who makes Rub-Tack, an agent for increasing tackiness? The answer to this and other brand names will be found on Page 201 of the 1937 RUBBER RED BOOK. Paper-bound copies, $2.00; cloth-bound, $3.00.

Obituaries

Walter B. Harding

Walter B. Harding, executive of the G & J Tire Division of United States Rubber Products, Inc., and one of the best known executives in the rubber bicycle tire industry, died in Methodist Hospital in Indianapolis on May 12 from injuries sustained when he was knocked down by an automobile a few days previous. He was 66 years of age. Mr. Harding was born in England and attended the Flowery Field School, Wellington College, and the Victoria University at Manchester, graduating from the latter in 1893. For the next 10 years he served in the British civil service at various occupations.

Mr. Harding came to the United States in 1904, settled in Indianapolis, and immediately became associated with the Indianapolis Rubber Company, which later became the G & J Tire Company. He served in turn as auditor, purchasing agent, assistant sales manager, secretary, assistant treasurer, and in 1916 became president. In 1931 the company was absorbed by U. S. Rubber Products, Inc., and he was named head of the newly-created subsidiary. At the time of his death he was still holding an executive position with the division.

During the World War, Mr. Harding was chairman of the rubber industries section of the automobile division in Indiana. He was one of the founders of the Victorian Society, an organization for British-born persons living in other lands and was its president from 1915 to 1920, although he became an American citizen in the shortest time permitted by the then existing law. Always interested in the promulgation of bicycle tires, he acted as president of the Cycle Trades of America last year, and previously was head of the Parts and Accessories Division of that organization. Mr. Harding was a member of the Masons, Elks, and other clubs, and at one time served as vice-president of the Indianapolis Chamber of Commerce. Funeral services were held on May 14. Interment was in Crown Hill Cemetery. He leaves one son.

Bruce W. Huling

Bruce W. Huling, veteran member of the B. F. Goodrich organization, died on June 2 in City Hospital, Akron, after an illness of a year. He was 61 years of age. Mr. Huling was born in Cleveland, was graduated from Western Reserve University in 1900, and was admitted to the Ohio bar in 1903. He was in the insurance business in Cleveland until 1910 when he joined the Goodrich organization in the tire repair department. In 1914 he became assistant sales manager of the Diamond tire division, and five years later became a Diamond tire salesman. Subsequently, he served in various sales capacities in the home office and at branch offices, and in 1926 became manager of the service department at Akron. In 1930, he went to Buenos Aires as vice-president and general manager of the Goodrich subsidiary in Argentina, and two years later held the same positions with the subsidiary maintained by the company at Johannesburg in South Africa. He returned to Akron in 1934 and did special sales work in the International Division, and the following year joined the automotive accessories department. He was assistant manager of the latter division when he was stricken a year ago. Mr. Huling was a 32nd degree Mason and a member of the Goodrich 20-year club. He leaves a widow.

Michael L. Donovan

Michael L. Donovan, popular rubber shoe sales executive, associated with the Cambridge Rubber Company for the past 12 years, was killed in an automobile accident on June 2 while driving from New York to Cambridge, Mass., to attend a company business conference. He was 49 years of age. Mr. Donovan was a graduate of Harvard, class of 1911, and was long associated with the E. T. Wright Company before joining Cambridge Rubber. He had also held executive positions with the Rhody Shoe Company, the South Shore Shoe Company, and the Federal Export Company, and at one time served as efficiency expert for the United Shoe Machinery Co. In recent years, he had acted as district manager for Cambridge Rubber in the New York territory, and also southern branches. During the World War, Mr. Donovan held the rank of Captain in the Officer's Corps attached to the General Supply Depot at Boston. Interment was in Rockland, Mass. He leaves a widow and one son.

Russell T. Elwell

Russell T. Elwell, well-known inventor of rubber specialties and one of America's pioneers of the rubber industry, died recently in Quincy, Mass., after a lengthy illness. Mr. Elwell started as a laborer for the Medford Rubber Company, rapidly advanced to executive positions in the company, and later resigned to join the Clifton Rubber Manufacturing Co., of Hyde Park, Mass., where he remained as superintendent for almost a quarter of a century. In 1899 he founded the old Walpole Rubber Works at Walpole, Mass., which was absorbed by U. S. Rubber in 1915. Included among Mr. Elwell's inventions were insulated tape and the well-known "Cats-Paw" rubber heel.

Richard C. Lewis

Richard C. Lewis, sales engineer for the Farrel-Birmingham Co., Inc., was killed in an airplane accident on May 24 en route to Cleveland when a United Airlines plane crashed in flames about eight miles from Cleveland Airport. Ten persons in all were killed. Mr. Lewis was born in Ansonia, Conn., received his early education in the local schools, and was graduated from the Worcester Polytechnic Institute in 1919. He joined Farrel-Birmingham shortly thereafter as a draftsman. He served in the U. S. Aviation Corps during the World War. At the time of his death he was manager of the rolling mill sales division of Farrel-Birmingham, but was well known to many rubber plant executives as well. He was a member of the A.S.M.E. and the A.S.M., while his fraternal affiliations included the Theta Chi fraternity, George Washington Lodge, and the Naugatuck Lodge of the I.O.O.F. He was also a member of the William H. Gordon Post of the American Legion. Funeral services were held on May 28, with interment in Pine Grove Cemetery in Ansonia.

Frank Maire

Frank Maire, president of the Lima Cord Sole and Heel Company, and prominent in several other Lima industries, died in a hotel in Iola, Kansas, recently, while en route to attend a business convention at Tulsa, Oklahoma. Mr. Maire, in addition to his activities with the rubber concern, was also president of the Lily White Oil Company, which operates stations throughout western Ohio, and was formerly president of the now defunct National City Bank of Lima and the *Lima Star,* now out of publication. He was interested in oil fields in Michigan, Ohio, Oklahoma and Kansas. Mr. Maire was a 32nd degree Mason. He leaves a widow.

Clinton S. Goodyear

Clinton S. Goodyear, a cousin of Charles Goodyear, the discoverer of vulcanization, and long associated with the Naugatuck plant of U. S. Rubber Products, Inc., in the cost and statistical departments, died on May 3 at his home in Naugatuck, Conn. Born in New Haven, Mr. Goodyear attended the Naugatuck High School and became affiliated with U. S. Rubber in 1897 after being graduated. He leaves a widow and one son. Interment was in Grove Cemetery, Naugatuck.

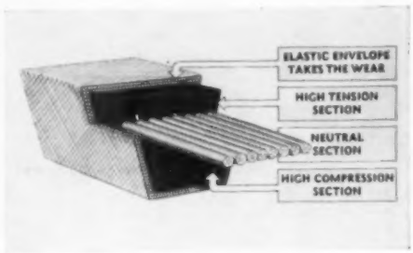
Synthetic Rubber in Japan

The Japan Rubber Company, Tokyo, is said to be planning the construction of a new factory to be devoted exclusively to the manufacture of synthetic rubber. The Mitsunaga process of the Umeno Chemical Laboratory, an enterprise of the South Manchuria Railway, will be used, according to reports from Japan.

New Rubber Goods

Goodyear Multi-V Belt

Said to be the closest matched multiple V drive belt yet achieved, the E-C Cord Multi-V Belt has been introduced



by the Goodyear Tire & Rubber Co., Akron, Ohio. The close matching of the belts used in multiple equalizes the strain and load-carrying on all the belts of the assembly, prolongs their life, and produces a more efficient drive, according to Goodyear. The load on the new belt is carried entirely by a layer of heavy, low-stretch, high-tensile cord, placed in a neutral section between rubber high tension and high compression sections. Surface wear is taken by an elastic fabric envelope with the weave on the bias.

Improved String-A-Lite

A molded rubber socket, constructed so that the lamp shell which is held in place by two small screws can be easily removed and replaced, features several new improvements in the String-A-Lite

moisture-proof lighting cable manufactured by the Sullivan Machinery Company, Michigan City, Indiana. String-A-Lite consists of No. 10 two-conductor rubber-covered cord on which moisture-proof end connectors and lamp socket connectors are integrally molded. The detachable lamp sockets are equipped with prong type connectors. Use of the molded rubber socket is said to reduce the cost of socket replacement.

All-Rubber Figurettes

The latest latex novelty to be introduced by the Seiberling Latex Products Company, Akron, Ohio, is an all-rubber figurette. Featuring Snow White and the Seven Dwarfs, these colorful novelties are flat character figurettes of fully decorated rubber with stand-up base. They are unbreakable, have permanent colors and are safe for children to play with. The Snow White figurette is approximately 3½ inches high; each of the dwarf figurettes measure approximately 3 inches in height. The decalcomania transfer process is used in the production of the figurettes.

"Oil Pruf" Industrial Tire

A new industrial tire, specially compounded to resist the action of animal, vegetable and mineral oil, known as the "Oil Pruf" tire, has been introduced by the B. F. Goodrich Company, Akron, Ohio. Tests in steel mills and meat packing houses are said to have indicated that the new industrial tires retain their original physical properties approximately 30% better than others when used in the presence of oils and other solutions usually classed as rubber solvents.

"Easies" Undershoes

A new undershoe, made of rubber fabric similar to that used in automobile tires and designed to provide the worker with a resilient cushion that absorbs shock on hard floors, is being mar-

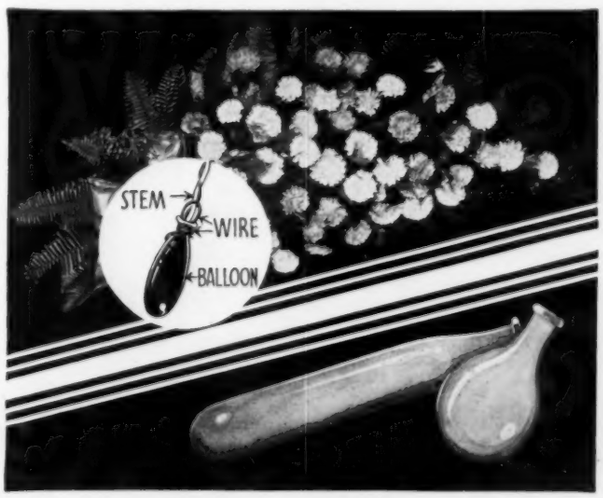
keted by the W. H. Long Co., 101 West Austin Ave., Chicago. Known as the "Easies" Undershoe, it is said to prevent slipping on wet or greasy floors. It slides easily over the shoe and is held in place with straps. Three sizes fit men's shoes and there is one model for women's shoes.

Akerite Shaft Bearing

An entirely new type of rubber shaft bearing, called Akerite, made by E. F. Aker of Belleville, N. J., and distributed by W. & J. Tiebout, 118 Chambers St., New York City, has recently made its appearance. It is said to have two new features not possessed by other rubber bearings: first, the rubber turns with the shaft and bears on the inside of a special hard nickel sleeve, instead of the shaft turning inside the rubber; and, second, the rubber sleeve can be replaced in case it becomes worn with little effort and cost. The Akerite bearing consists of a metal sleeve whose inside diameter is slightly more than the diameter of the shaft, each end of the sleeve having four slits about an inch long over which drive rings are fitted and driven up tight toward the center, securely clamping the sleeve to the shaft. The rubber bearing sleeve fits tightly on the inside sleeve and is bonded to its knurled surface. The outside bushing of nickel is pressed into place in the strut, the latter having four rows of lubricating holes which line up with tapered water channels in the strut and thus feed a steady flow of water to act as a lubricant between the rubber and nickel. Reduction of vibration, ease of installation, and ease of replacement are among advantages claimed for the new bearing.

Rubber Water Pouches

Green rubber water pouches, primarily intended for use in connection with floral sprays used at weddings, funerals, and as banquet decorations, are being marketed by the Anderson Rubber Company, Akron, Ohio. In use, the pouch is filled with water and then fastened to every individual stem of the flower in the spray. This increases the life of the flowers from 48 to 72 hours, according to Anderson, and enables florists to make up displays a day or two in advance of the particular occasion. It also enables the florist to use shorter stemmed flowers and still have attractive, fresh sprays for a number of hours.



Floral spray with magnified section showing an Anderson rubber water pouch actually attached to the stem of the flower.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, JUNE 8, 1938

Crude Rubber

CRUDE rubber prices have moved erratically since our last report. The scarcity of sellers and high quotations for offerings from the Far East kept the price on the Exchange above the 12-cent level during May 11, 12 and 13, but the publication of poor consumption figures for April combined with commission house selling brought the price down to 11.72 on May 16. A better stock market the following day resulted in a return to higher prices, but a weakening market, easier securities, the strike at Goodrich, and lower foreign cables combined to send the price tumbling to 11.12 on May 23, low for the period. Prices continued spotty for the rest of May, with some improvement shown on May 31 following the announcement of a 45% quota on permissible exports from signatory countries by the International Rubber Regulation Committee. Buying by factory interests and commission houses in the past few days has served to bring the price back into somewhat higher channels, today's quotation closing at 11.68. Quotations in the outside market, Exchange, London and Singapore, follow:

As of June 8

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.11¾
July-September	—	@	.11⅞
October-December	—	@	.12
No. 2	—	@	.11⅝
No. 3	—	@	.10⅞
No. 4	—	@	.10¾
Thin Latex Crepe	—	@	.12⅞
Thick Latex Crepe	—	@	.13⅜
Brown Crepe, No. 1	—	@	.11
Brown Crepe No. 2	—	@	.10⅞
Amber Crepe, No. 2	—	@	.11
Amber Crepe, No. 3	—	@	.10⅞
Amber Crepe, No. 4	—	@	.10 1/16
Brown Crepe, Rolled	—	@	.09 1/16

Latex—

Normal, per lb., carload lots	.14½	@	.14⅝

Paras—

Up-River, fine	—	@	.11¼
Acre Bolivian, fine	—	@	.11½

Balata—

Surinam sheet	—	@	.38

LONDON MARKET

Standard Smoked Sheets—Buyers—June 8

July-September	—	@	5 1/32d
October-December	—	@	5 1/32d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—June 8

July-September	—	@	5 7/32d
October-December	—	@	5 5/32d

Reclaimed Rubber

Business continues dull in the reclaiming field, with all eyes trained on the automotive industry. A spurt in automobile production will result in an immediate pick-up of sales on reclaim. Consumption of reclaim during April amounted to 7,480, a drop from the 8,573 reported for the previous month. There has been no change in the price structure since our last report.

Shoe

Unwashed	lb.	.07	@	.07¼
Washed	lb.	.10½	@	.10¾

Tube

No. 1 (Floating)	lb.	.14	@	.14½
No. 2 (Compounded)	lb.	.09	@	.09½
Red tube	lb.	.09	@	.09½

Tires

Black (acid process)	lb.	.07¼	@	.07½
Black, selected tires	lb.	.06¼	@	.06½
Dark Gray	lb.	.09¾	@	.10
White	lb.	.13	@	.13½
Truck, Heavy Gravity	lb.	.06	@	.06½
Truck, Light Gravity	lb.	.07½	@	.08

Miscellaneous

Mechanical blends	lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Although business has been practically stagnant for the past thirty days, scrap rubber dealers report revived factory interest in the last week or so. Since our last report, prices have been reduced on all grades of scrap except auto tire peeling and untrimmed arctic stocks. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	15.50	@16.00
Mixed auto	ton	10.00	@11.00
Beadless tires	ton	14.00	@15.00
Clean solid truck tires	ton	21.00	@23.00
Boots and shoes	ton	17.00	@18.00
Arctics, untrimmed	ton	12.00	@14.00
Inner tubes, No. 1	lb.	.07	@ .08
Inner tubes, No. 2	lb.	.03½	@ .03 5/8
Inner tubes, Red	lb.	.03⅜	@ .03½

Cotton

Although cotton prices moved upward slowly in the middle of May, due largely to scarcer offerings from Bombay, the appearance of further unwanted rainfall in Texas, improved sales of some classes of textiles, and some speculative enthusiasm occasioned by the Government's pump-priming activities, they soon started a decline. Factors involved in the declining price situation included more favorable weather in the South, liquidation from domestic quarters, heavy selling orders from Liverpool and Bombay, unfavorable business conditions, and the erratic movement of the stock market. High for the period was a price of 8.76 on May 13; low was 7.84 on June 2. A temporary halt to the decline occurred during the first few days of the current month, but the price dipped again on June 6 and has remained steady at 7.89 since that date. Consumption of cotton during April amounted to 414,000 bales, a decline of more than 100,000 bales from March and more than 300,000 bales under consumption in April, 1937. Quotations for middling uplands on the Exchange follow:

	May 10	June 8		
	Close	High	Low	Close
July	8.67	8.00	7.93	7.98
October	8.70	8.04	7.96	8.02
December	...	8.06	7.99	8.05

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.27¾	@ .28¾
Peeler, carded, 23/4/3	lb.	.28¾	@ .29¾
Peeler, carded, 15/3/3	lb.	.25¾	@ .26¾
Peeler, carded, 13/3/3	lb.	.24¾	@ .25¾
Egyptian, carded, 23/5/3	lb.	.41	@ .41½
Egyptian, combed, 23/5/3	lb.	.46	@ .46½

CHAFERS

Carded, American, 1 1/16"	lb.	.27¼	@ .28
Carded, American, 1"	lb.	.19½	@ .23½

Sheetings

48x40	36 in.	5.50	lb.	—	@	.03½
40x40	36 in.	6.15	lb.	—	@	.03⅜
40x36	36 in.	6.50	lb.	—	@	.03
48x48	40 in.	2.50	lb.	—	@	.07
48x48	40 in.	2.85	lb.	—	@	.06⅜
56x60	40 in.	3.60	lb.	—	@	.05¾
48x44	40 in.	3.75	lb.	—	@	.05
44x40	40 in.	4.25	lb.	—	@	.04 5/8

Ducks

Enameling (single filling)	lb.	.21	@ .23
Belting and Hose	lb.	.25	@ —
Single filling, A grade	lb.	.09½	@ .12½
Double filling	lb.	.10½	@ .13½

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM MAY 11 TO JUNE 8

Date		Spot	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Sales
May	11	12.05	12.05	12.09	12.13	12.20	12.26	12.34	12.41	12.46	12.53	12.58	12.63	12.68	——	219
	12	12.08	12.08	12.12	12.16	12.21	12.35	12.40	12.45	12.50	12.55	12.60	12.65	12.70	——	108
	13	12.02	12.02	12.06	12.10	12.18	12.24	12.31	12.36	12.42	12.47	12.52	12.57	12.62	——	158
	14	11.87	11.83	11.87	11.91	11.97	12.04	12.10	12.16	12.23	12.28	12.33	12.39	12.44	——	129
	15	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	16	11.72	11.72	11.75	11.78	11.84	11.91	11.97	12.03	12.10	12.15	12.21	12.27	12.33	——	94
	17	11.81	11.80	11.83	11.86	11.93	12.00	12.07	12.15	12.20	12.27	12.32	12.38	12.43	——	192
	18	11.87	11.85	11.89	11.94	12.01	12.09	12.15	12.21	12.26	12.33	12.39	12.45	12.51	——	44
	19	11.51	11.51	11.54	11.57	11.64	11.72	11.78	11.84	11.91	11.95	12.00	12.05	12.10	——	208
	20	11.33	11.30	11.33	11.36	11.42	11.49	11.55	11.62	11.69	11.72	11.78	11.85	11.91	——	287
	21	11.15	11.15	11.18	11.21	11.29	11.38	11.42	11.47	11.52	11.57	11.62	11.66	11.72	——	85
	22	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	23	11.12	11.10	11.13	11.17	11.23	11.29	11.35	11.41	11.47	11.55	11.59	11.64	11.69	——	167
	24	11.25	11.20	11.23	11.27	11.34	11.42	11.46	11.54	11.61	11.69	11.73	11.77	11.82	——	134
	25	11.30	11.27	11.29	11.31	11.37	11.44	11.51	11.58	11.65	11.72	11.75	11.78	11.82	——	152
	26	11.15	——	11.14	11.16	11.24	11.32	11.36	11.42	11.49	11.55	11.60	11.66	11.71	——	284
	27	11.30	——	11.29	11.31	11.38	11.45	11.51	11.57	11.63	11.69	11.73	11.78	11.83	——	241
	28	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	29	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	30	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	31	11.45	——	11.46	11.48	11.54	11.58	11.64	11.68	11.70	11.78	11.82	11.85	11.91	——	443
June	1	11.35	——	11.35	11.37	11.45	11.52	11.58	11.63	11.66	11.74	11.78	11.82	11.87	11.92	161
	2	11.30	——	11.31	11.33	11.38	11.44	11.51	11.58	11.65	11.69	11.73	11.77	11.81	11.85	195
	3	11.25	——	11.25	11.27	11.33	11.40	11.46	11.52	11.57	11.63	11.67	11.71	11.76	11.81	228
	4	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	5	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
	6	11.50	——	11.52	11.53	11.60	11.66	11.72	11.78	11.85	11.90	11.95	12.00	12.05	12.10	192
	7	11.50	——	11.54	11.56	11.62	11.69	11.74	11.80	11.86	11.91	11.96	12.01	12.07	12.13	226
	8	11.68	——	11.71	11.73	11.80	11.87	11.92	11.97	12.03	12.08	12.13	12.18	12.24	12.30	245

New York
June 8, 1938

Rubber CHEMICAL Markets

All Quotations F.O.B. Works Unless Noted

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.26	@	—
A-5-10	lb.	.35	@	.40
A-11	lb.	.52	@	.65
A-19	lb.	.52	@	.65
A-32	lb.	.70	@	.80
A-77	lb.	.42	@	.55
A-100	lb.	.42	@	.55
A-433	lb.	.45	@	.55
Aldehyde ammonia, crystals	lb.	.65	@	.70
Altax	lb.	.55	@	.70
Butyl Zimate	lb.	3.00	@	—
Captax	lb.	.50	@	.60
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.46
Diphenylguanidine	lb.	.35	@	.36
El-Sixty	lb.	.57	@	—
Ethyl Zimate	lb.	3.00	@	—
Ethylidene aniline	lb.	.42	@	.43
Formaldenyde aniline	lb.	.37½	@	.42
Guantal	lb.	.45	@	—
Heptene	lb.	.40	@	—
Hexamethylenetetramine	lb.	.36	@	—
Lead Oleate, No. 999	lb.	.14	@	—
Witco		.15	@	—
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	3.25	@	—
Oxynone	lb.	.64	@	.80
Phenex	lb.	.50	@	.55
Pip-Pip	lb.	2.50	@	—
Pipsolene	lb.	1.55	@	1.85
R & H 40	lb.	.40	@	.41
R & H 50-D	lb.	.42	@	.43
R-2	lb.	1.40	@	1.80
R-23	lb.	.40	@	—
Rotax	lb.	.60	@	.65
Safex	lb.	1.20	@	1.25
SPDX	lb.	.75	@	—
Super-Sulphur No. 1	lb.	.50	@	—
No. 2	lb.	.20	@	.50
Thiocarbanilid, drums	lb.	.24	@	—
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.60	@	—
Tuads	lb.	3.00	@	—
Ureka	lb.	.60	@	.75
Ureka Blend B	lb.	.60	@	.75
Ureka C	lb.	.56	@	.65
Vulcanex	lb.	.42	@	.43
Vulcone	lb.			
Vulcanol	lb.	.85	@	—
Z-88-P	lb.	.51	@	—
Zimate	lb.	3.00	@	—
Inorganic				
Litharge, domestic	lb.	.06½	@	.07¾
Magnesia, calcined, heavy	lb.	.04	@	—

COLORS

Blacks (See Compounding Materials)				
Blues				
Prussian	lb.	.36	@	.37
Ultramarine	lb.	.15	@	—
Browns				
Mapico	lb.	.13	@	—
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome	lb.	.21	@	—
Chromium Oxide, bbl.	lb.	.21	@	—
Guignet's Green	lb.	.70	@	—
Reds				
Antimony				
crimson, 15/17	lb.	.48	@	—
sulfur, free	lb.	.48	@	.60
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼	@	—
Whites				
Cryptone, No. 19	lb.	.05⅞	@	.06⅛
Cryptone CB, No. 21	lb.	.05⅞	@	.06⅛
Cryptone, ZS-20	lb.	.09	@	.09¼
Cryptone, ZS-86	lb.	.09	@	.09½
Lithopone				
Albalith, black label—11 lb.		.04⅜	@	.04⅝
Azolith	lb.	.04⅜	@	.04⅝
Ray-bar	lb.	.05⅞	@	.06⅜
Ray-cal	lb.	.05⅞	@	.06⅜
Rayox	lb.	.16	@	.19
Titanox A	lb.	.16	@	.16¼
Titanox B	lb.	.05⅞	@	.06⅛
Titanox C	lb.	.05⅞	@	.06⅛
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06¼	@	.06½
Anaconda, lead free	lb.	.06¼	@	.06½
Horsehead Lead Free Brand:				
Special—3	lb.	.06¼	@	.06½
XX Red—4	lb.	.06¼	@	.06½
XX Red—72	lb.	.06¼	@	.06½
XX Red—78	lb.	.06¼	@	.06½
XX Red—103	lb.	.06½	@	.06¾
Kadox, black label—15	lb.	.06½	@	.06¾
Blue label—16	lb.	.06½	@	.06¾
Red label—17	lb.	.06½	@	.06¾
St. Joe, black label	lb.	.06¼	@	.06½
green label	lb.	.06¼	@	.06½
red label	lb.	.06¼	@	.06½
U S. P.—7, bbls.	lb.	.09	@	.09¼
Zinc Oxide—French Process				
Florence White seal—7 bbls.	lb.	.08½	@	.08¾
Green seal—8	lb.	.08	@	.08¼
Red seal—9	lb.	.07½	@	.07¾
Yellows				
Cadmolith	lb.	.50	@	.55
Chrome	lb.	.14½	@	.15½
Mapico	lb.	.09½	@	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.027	@	.036
Bone, powdered	lb.	.05½	@	.12½
Carbon, compressed	lb.	.0435	@	.0775
uncompressed	lb.	.0435	@	.0775
"Certified"	lb.	—	@	—
Spherons	lb.	—	@	—
"Disperso"	lb.	.027	@	.036
Drop, bbls.	lb.	.05½	@	.14
"Excello," compressed	lb.	.0435	@	.0775
"Fumonex"	lb.	.03	@	.07
"Gastex"	lb.	.03	@	.07
Lampblack	lb.	.07	@	.12
"Micronex"	lb.	.027	@	.036
"Supreme"	lb.	.0435	@	.0775
Thermatomic—"P 33"	lb.	.04¾	@	.07¾
"Thermax"	lb.	.01¾	@	.05
United "Dixie" & "Kosmos"	lb.	.027	@	.036

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	13.00	@	15.00
Barium carbonate (98-100%)	ton	—	@	—
Barium Dust	lb.	.05	@	.06
Barytes	ton	23.65	@	31.15
Basofor	lb.	.04½	@	—
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	60.00	@	65.00
Calcene	ton	37.50	@	45.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra lt.	ton	45.40	@	60.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	9.50	@	21.00
Congaree	ton	9.50	@	—
Crown (f.o.b. plant)	ton	9.50	@	—
Dixie	ton	11.00	@	30.00
Dixie, Jr.	ton	9.50	@	29.00
McNamee	ton	9.50	@	22.00
Par	ton	9.50	@	22.00
Witco	ton	9.50	@	—
Cotton Flock	lb.	.11	@	.15
Glues, extra white	lb.	.28	@	.30
medium white	lb.	.14	@	.19
Kalite No. 1	ton	24.00	@	50.00
Kalite No. 3	ton	34.00	@	60.00
"Lime Crest" Industrial Filler No. 100	lb.	—	@	—
Magnesium carbonate	lb.	.07½	@	—
Mica	ton	35.00	@	44.00
Pyrax A	ton	7.50	@	20.00
Rottenstone (powdered)	lb.	.02½	@	.05
Soapstone, powdered	ton	16.00	@	22.00
Starch, powdered	cwt.	2.90	@	4.10
Talc, domestic	ton	17.00	@	20.00
Whiting, commercial	ton	17.00	@	18.00
Columbia Filler	ton	9.00	@	14.00
English Cliffstone	ton	33.00	@	43.00
Witco	ton	7.00	@	—
Wood Flour	ton	20.00	@	25.00
Zinc Carbonate	lb.	—	@	.10¾
Zinc Stearate	lb.	—	@	.27

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00	@	42.00
Black Diamond	ton	27.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton	22.00	@	42.00
Parmr, solid	ton	25.00	@	—
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50	@	4.00
Rodo #10	lb.	4.50	@	5.00
Curodex 19	lb.	2.75	@	—
Curodex 188	lb.	3.50	@	—
Curodex 198	lb.	4.50	@	—
Para-Dors No. 5145	lb.	2.00	@	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.40	@	—
Darvan (dispersing agent)	lb.	.30	@	.50
Santomerse (dispensing, wetting, penetrating and stabilizing agent)	lb.	.13	@	—
Sunproof	lb.	.35	@	.37½
Sponge Paste	lb.	—	@	.80
Tackol (tackifier)	lb.	.115	@	—
Tonox	lb.	.56	@	.60

SOFTENERS

Acids				
Acetic, 28%, bbls.	100 lb.	2.53	@	2.78
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Acids, Fatty				
Laurex	lb.	.15	@	.16
Stearex Beads	lb.	.10¾	@	.11¾
Stearic, double pressed	lb.	.12½	@	.13½
Stearite	lb.	.10½	@	.11¾
Alkalies				
Caustic Soda, 76%	cwt.	3.15	@	3.80
Soda Ash, 58%, C.L.	cwt.	—	@	2.35
Oils				
Cycline Oil	gal.	.20	@	—
Degras, bbls.	lb.	.07¾	@	.08
Fluxrite	lb.	.05½	@	.06½
Palm Niger	lb.	.05½	@	.06½
Para-Flux	gal.	.17	@	—
Petrolatum, light	lb.	.03½	@	.03¾
Pigmentaroil, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
Pine, steam distilled	gal.	.64	@	.69
dest. dist., drums	gal.	.49	@	.50
Rosin Oil, cmpd.	gal.	.40	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rubtack	lb.	.08	@	.10
Seedine, c.l.	lb.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.07	@	—
Witco Softener No. 20	gal.	.20	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.05½	@	.06½
coal tar	ton	19.00	@	22.00
hardwood	ton	16.00	@	22.50
pine, 200 lb. gr. wt.	bbl.	6.00	@	6.50
Pigmentar, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
R. S. L. Resin	lb.	—	@	—
Retort Pine Tar, drums	ton	20.00	@	26.00
Solvents				
Acetone, pure	lb.	—	@	.06¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33	@	.39
Benzene, 90%	gal.	.18	@	.23
Beta-Trichlorethane	gal.	—	@	.20
Bondogen	lb.	.98	@	1.65
Carbon, bisulfide	lb.	.05¼	@	.08
Carbon tetrachloride	lb.	.05¾	@	.08¾
Dichlorethylene	lb.	—	@	.25
Dipentene, cml., drums	gal.	.41	@	.50
Dryolene (f.o.b. Okla.)	gal.	.10	@	.10½
Ethylene dichloride	lb.	.05¼	@	.06¼
Plastogen	lb.	.07¾	@	.12½
Reogen (drums)	lb.	.11½	@	.20
Rub-Sol (t.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.09½
Turpentine, spirits	gal.	.43	@	.47
dest. dist., drums	gal.	.33	@	.41
Waxes				
Beeswax, white	lb.	.39	@	.45
Carnauba, yellow	lb.	.46	@	.47½
Ceresin, white, dom.	lb.	.08	@	.11
Montan, crude	lb.	.10¾	@	.11¾
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.02¾	@	—
White crude scale 124/126	lb.	.02¾	@	.03
Refined, 122/127	lb.	.04½	@	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.50	@	2.10
Exel	lb.	1.00	@	1.40
Gel	lb.	.57	@	.77
Hipar	lb.	.65	@	.92
Powder	lb.	.52	@	.73
Resin	lb.	.52	@	.73
Resin D	lb.	.52	@	.73
White	lb.	1.25	@	1.75
Albasan	lb.	.70	@	.75
Antox	lb.	.56	@	—
B-L-E	lb.	.57	@	.60
Flectol H	lb.	.54	@	—
Flectol White	lb.	1.00	@	—
Flectol B	lb.	.54	@	—
Neozone	lb.	.63	@	—
Oxynone	lb.	.68	@	—
Perflectol	lb.	.67	@	.75
Retardex	lb.	.35	@	.40
Santoflex A	lb.	—	@	—
Santoflex B	lb.	.54	@	—
Stabilite	lb.	.57	@	.62
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.55	@	.60

MOLD LUBRICANTS

Aresklene	lb.	—	@	—
Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Lubrex	lb.	.25	@	.30
Mold Paste	lb.	.18	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rusco, f.o.b. Nitro	lb.	.25	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.19	@	—
Black	lb.	.07	@	.13½
White	lb.	.085	@	.15¼
Brown	lb.	.085	@	.14
Neophax	lb.	.11	@	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½	@	.15
Sulfur Chloride, yellow (drs.)	lb.	.04	@	—
Sulfur flour.				
Refined, 100% pure (bags)	cwt.	2.50	@	3.65
Commercial (bags)	cwt.	1.60	@	2.35
Telloy	lb.	2.00	@	—
Vandex	lb.	2.00	@	—

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,362	185,060,304	26.71	8,772	5,672,319	28.87	300,590
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1937:							
Mar.	38,682	16,030,267	18.50	1,146	522,931	20.37	37,536
Apr.	41,427*	17,859,223	19.31	1,050	415,484	17.66	40,377*
May	46,902	22,163,440	21.10	528	270,499	21.08	46,374
June	47,073	22,559,545	21.39	807	390,542	21.60	46,266
July	41,493	19,010,273	20.45	767	300,301	17.48	40,726
Aug.	48,020	20,595,314	19.15	670	265,298	17.69	47,350
Sept.	55,123	22 119,248	17.91	668	280,741	18.76	54,455
Oct.	51,171	20,250,893	17.67	450	172,466	17.13	50,721
Nov.	51,958	19,905,523	17.01	159	66,501	18.72	51,799
Dec.	68,006	24,934,206	16.37	290	91,764	14.14	67,716
1938:							
Jan.	43,984	15,115,732	15.34	325	118,514	16.27	43,659
Feb.	39,380	13,095,429	14.85	305	109,756	16.08	39,075
Mar.	41,592	13,494,654	14.48	646	198,865	13.74	40,946
Apr.	31,042	9,495,476	13.66	250	75,797	13.55	30,792

* Revised.

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1937:								
Mar.	136	37,453	29	13,949	898	187,413	2,216	968,053
Apr.	190	52,361	3	1,457	617	135,412	1,633	724,757
May	182	50,093	75	33,881	642	145,618	1,995	941,235
June	147	39,941	91	41,481	488	135,468	2,561	1,253,370
July	371	106,360	22	9,363	533	158,998	1,921	924,127
Aug.	335	95,893	16	5,876	363	107,611	1,801	838,778
Sept.	329	90,822	5	2,196	701	214,511	1,901	839,159
Oct.	247	68,178	29	12,090	460	149,516	1,958	844,205
Nov.	251	69,452	29	9,374	593	194,889	2,085	875,074
Dec.	140	34,347	31	11,491	1,325	470,553	1,804	694,164
1938:								
Jan.	538	147,685	23	8,958	598	224,443	1,400	494,242
Feb.	218	60,097	33	11,393	892	355,080	1,684	560,883
Mar.	150	41,518	69	19,454	587	239,271	979	327,844
Apr.	188	50,423	66	25,741	1,265	444,756	889	295,690

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)
(All Quantities in Long Tons)

	Figures on Monthly Basis: 1931	1932	1933	1934*	1935*	1936*	1937	1938
Jan.	28,557	29,648	22,645*	39,190	46,636	48,631	50,818*	29,429
Feb.	28,797	31,821	21,392*	40,515	42,720	36,841	51,887*	23,868
Mar.	32,788	29,505	17,483*	47,003	42,153	42,813	54,064	30,487
Apr.	33,321	27,518	25,928	44,853	44,247	52,031	51,859*	27,984
May	37,817	30,957	44,074	42,918	41,101	50,612	51,733	
June	37,916	41,475	50,743*	40,147	36,156	52,772	51,798	
July	31,397	29,976	49,614*	32,553	35,917	48,250	43,650	
Aug.	27,586	23,721	44,428*	33,216	38,775	46,777	41,456	
Sept.	23,638	23,847	35,281*	30,258	37,086	46,449	43,893	
Oct.	22,277	22,286	31,543*	31,253	41,969	49,637	38,707	
Nov.	22,943	23,231	28,831*	34,748	42,310	50,433	33,984	
Dec.	21,409	18,015	28,757*	36,569	42,474	49,754	29,160	
Tt.	348,986	332,000	400,719*	453,223	491,544	575,000	543,009	

* Revised.

Note: Figures for 1936 were revised on May 15, 1937, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks[a]	Year	Production	Consumption Tons	Consumption % to Crude	Stocks[a]
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	113,078*	23.0*	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	141,486*	24.6*	19,000*
1932	75,608	77,504	23.4	16,354	1937	178,776	157,990	29.1	26,260

Figures on Monthly Basis									
1937:									
Jan.*	15,129	14,450	28.4	18,822	July	16,241*	12,128*	27.8*	17,682*
Feb.*	15,192	14,578	28.1	18,490	Aug.	16,543*	13,227*	31.9*	19,706*
Mar.*	14,462	15,601	28.9	16,450	Sept.	16,410	13,681	37.4	21,597
Apr.	13,884	15,607	30.1	14,046	Oct.	15,849	12,234	31.6	23,572
May	15,793	14,693	28.4	14,647	Nov.	12,406	9,703	28.6	24,620
June	16,052	14,414	27.8	14,535	Dec.	10,815	7,674	26.3	26,260
1938:									
Jan.	8,467	6,673	22.7	27,179	July	.....	.....	...	.....
Feb.	6,012	6,867	28.8	26,431	Aug.	.....	.....	...	.....
Mar.	6,669	8,573	27.1	24,401	Sept.	.....	.....	...	.....
Apr.	6,399	7,480	26.7	23,339	Oct.	.....	.....	...	.....
May	.....	.....	...	.....	Nov.	....	.....	...	.....
June	.....	....	...	.....	Dec.	.....	.....	...	.....

[a] Stocks on hand at the end of month or year.
* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1936*	1937	1938		1936*	1937	1938
January	32,344	33,696	35,176	August	46,061	49,597	
February	27,178	32,000	31,861	September	44,366	47,245	
March	35,864	40,561	41,259	October	44,163	45,361	
April	38,864	43,409		November	39,954	42,666	
May	42,010	45,484		December	39,590	39,457	
June	44,522	48,580					
July	46,865	50,704*		Total	481,606	518,760	

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,192
1929	24,141,502	1933	8,713,962	1937	22,257,964

1938		1938		1938	
January	527,899	May	.....	September .	.....
February ..	477,600	June	.....	October ...	.....
March	854,031	July	.....	November ..	.....
April	970,545	August	.....	December ..	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market. in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1936																																
March		15⅝		15⅜	15⅞	15⅜	15⅜		15⅜		15⅜	15⅜	15⅜	16		15⅜	15⅝	15⅜														15 7/16
April		15⅛		15⅛		15⅛	15⅛	16	15⅛		15⅛	15⅛	15⅛	16⅛		16⅛	16⅛	16⅛														16
May		15⅛		15⅛		15⅛	15⅛	15⅞	15⅛		15⅛	15⅛	15⅛	15⅞		15⅞	15⅞	15⅞														15⅝
June		15⅜		15⅛		15⅛	15⅛	15⅞	15⅛		15⅛	15⅛	15⅛	15⅞		15⅞	15⅞	15⅞														15⅝
July		15⅜		15⅛		15⅛	15⅛	15⅞	15⅛		15⅛	15⅛	15⅛	15⅞		15⅞	15⅞	15⅞														15⅝
Aug.		16⅛		16⅛	16¼	16⅛	16⅛	16⅛	16⅛	16¼	16⅛	16⅛	16⅛	16⅞		16⅞	16⅞	16⅞														16⅝
Sept.		16⅜		16⅛	16½	16⅛	16⅛	16⅛	16⅛	16½	16⅛	16⅛	16⅛	16⅞		16⅞	16⅞	16⅞														16⅝
Oct.		16⅜		16⅛	16½	16⅛	16⅛	16⅛	16⅛	16½	16⅛	16⅛	16⅛	16⅞		16⅞	16⅞	16⅞														16⅝
Nov.		17⅛		17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅞		17⅞	17⅞	17⅞														17⅝
Dec.		18½		18⅜	19	17⅞	19⅛	19⅛	19⅛	19⅛	19	19	19	19¼		19⅛	19⅛	18⅞														18
1937																																
Jan.		21		21⅜	20⅜	21⅛	21⅛	21⅛	22⅛	21⅜	22⅜	22⅛	22	21⅛	21⅛	21⅜	21⅜	21⅛	20⅛	21⅛	20⅛		20⅝	20⅝	21⅜	21⅜	21⅜	21⅜	21⅛				21⅜
Feb.		21⅛		21⅛	21¾	21½	21⅛	21⅛	21¾	21⅜	23⅜	23⅛	23⅜	23⅛	23⅜	24⅞	24⅞	25⅛	24⅜	24⅜	24⅜		24⅜	23⅝	25⅛	25⅛	25⅛	25⅛	25⅛				24 7/16
Mar.		21⅛		21⅛	22⅜	22⅛	22⅛	22⅛	22⅝	23⅜	23⅜	23⅛	23⅜	23⅛	23⅜	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞		23⅞	23⅞	23⅞	23⅞	23⅞	23⅞	23⅞				23⅝
April		26⅜		26⅛	25¾	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞		24⅞	24⅞	24⅞	24⅞	24⅞	24⅞	24⅞				24⅞
May		21		21⅛	21½	21⅛	21⅛	22½	21⅛	21⅛	21⅝	21½	20⅞	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛		20⅛	20⅛	20⅛	20⅛	20⅛	20⅛	20⅛				20⅛
June		20⅛		19⅛		19⅛	18⅞	19⅛	18⅝	19⅛	18⅞	18⅞	19	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛		19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛				19⅛
July		19⅜		19⅛	18½	18⅛	18⅛	19⅛	18⅞	19⅛	18⅞	18⅞	19	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛		19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛				19⅛
Aug.		18⅜		18⅛	17⅝	17⅝	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛		18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛				18⅛
Sept.		18⅛		18⅛	17⅝	17⅝	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛		18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛				18⅛
Oct.		17⅝		17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝		17⅝	17⅝	17⅝	17⅝	17⅝	17⅝	17⅝				17⅝
Nov.		16⅝		16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝		16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝				16⅝
Dec.		16⅝		16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝		16⅝	16⅝	16⅝	16⅝	16⅝	16⅝	16⅝				16⅝
1938																																
Jan.		14⅞		14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞		14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞				14⅞
Feb.		14⅞		14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞		14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞				14⅞
Mar.		14⅞		14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞		14⅞	14⅞	14⅞	14⅞	14⅞	14⅞	14⅞				14⅞
April		11⅞		11½	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	12	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞		11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞				11⅞
May		11⅜		11⅛	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜		11⅜	11⅜	11⅜	11⅜	11⅜	11⅜	11⅜				11⅜
June		11⅞		11⅞		11⅞	11½	11¾																								

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1911-1930

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98

Average Monthly Price per Pound Since 1930

	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents
Jan.	8.34	4.38	3.08	9.32	13.10	14.35	21.37	14.63
Feb.	7.70	4.03	2.95	10.45	12.92	15.48	21.33	14.71
Mar.	7.71	3.35	3.01	11.01	11.51	15.89	24.09	13.55
Apr.	6.43	3.02	3.56	12.10	11.55	15.98	23.44	11.84
May	6.49	3.09	4.95	13.26	12.05	15.62	21.14	11.57
June	6.35	2.66	6.15	13.51	12.57	15.85	19.29	
July	6.37	2.89	8.01	14.60	12.10	16.49	18.86	
Aug.	5.38	3.63	7.31	15.47	11.98	16.25	18.37	
Sept.	5.08	3.84	7.30	15.36	11.55	16.46	18.55	
Oct.	4.87	3.65	7.64	13.96	12.62	16.55	16.28	
Nov.	4.65	3.44	8.66	13.04	13.15	17.97	14.60	
Dec.	4.64	3.24	8.87	12.98	13.28	20.01	15.41	
Average for Year	6.17	3.49	5.96	12.92	12.37	16.41	19.39	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1938 Mar.	1938 Apr.	1938 May	1938 June	Day	1938 Mar.	1938 Apr.	1938 May	1938 June
1	7 7/8	5 7/16		5 5/16	17	6 7/8		5 1/16	
2	7 7/8	5 5/16	5 7/16	5 5/16	18	6 1/4		5 3/4	
3	7 7/16		5 5/8	5 1/16	19	6 3/4	6 1/16	5 1/16	
4	7 1/16	5 1/2	5 5/8		20		6 1/8	5 1/2	
5	7	5 3/8	5 5/8		21	6 1/4	6 1/8	5 1/2	
6		5 1/16	5 1/16		22	6 1/16	6 1/8		
7	7	5 3/8	5 3/4	5 1/4	23	6 3/8	6 1/4	5 3/8	
8	6 1/8	5 3/4		5 1/16	24	6 3/8		5 1/2	
9	6 1/16	5 7/8	5 5/8		25	6 1/16	5 1/16	5 3/8	
10	6 1/16		5 7/8		26	6 1/16	5 1/16	5 1/2	
11	6 7/8	5 3/4	5 7/8		27		5 1/16	5 7/16	
12	6 3/4	5 3/4	5 1/16		28	6 1/16	5 3/4	5 7/16	
13		5 1/16	5 7/8		29	5 3/4	5 1/2		
14	6 1/16	5 1/16	5 5/8		30	5 1/16	5 1/16	5 5/16	
15	6 7/8				31	5 1/16		5 5/8	
16	6 7/8		5 1/16						

Average Monthly Price Per Pound

Month	1935 Pence	1936 Pence	1937 Pence	1938 Pence	Month	1935 Pence	1936 Pence	1937 Pence	1938 Pence
Jan.	6.434	6.758	10.378	7.077	Aug.	5.696	7.581	8.830	
Feb.	6.292	7.255	10.503	7.029	Sept.	5.508	7.577	8.935	
Mar.	5.745	7.450	11.766	6.590	Oct.	6.130	7.898	7.855	
Apr.	5.604	7.502	11.471	5.793	Nov.	6.308	8.572	7.080	
May	5.822	7.335	10.250	5.632	Dec.	6.340	9.580	7.332	
June	6.027	7.352	9.548		Average for Year	5.976	7.713	9.424	
July	5.801	7.696	9.136						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1938 Apr.	1938 May	1938 June	Date	1938 Apr.	1938 May	1938 June	Date	1938 Apr.	1938 May	1938 June
1	8.63		7.89	11	8.66	8.68		22	8.96		
2	8.72	8.67	7.84	12	8.77	8.65		23	8.94	8.51	
3		8.65	8.03	13	8.71	8.76		24		8.37	
4	8.63	8.63	8.06	14	8.98	8.72		25	8.85	8.21	
5	8.59	8.57		15				26	8.78	8.08	
6	8.53	8.70	7.89	16			8.62	27	8.90	8.01	
7	8.44	8.67	7.89	17			8.63	28	8.81	7.92	
8	8.57		7.89	18	9.03	8.65		29	8.76		
9	8.64	8.67		19	8.88	8.58		30	8.78		
10		8.67		20	8.84	8.53		31		7.71	
				21	8.94	8.52					

Average Monthly Price Per Pound

	1935 Cents	1936 Cents	1937 Cents	1938 Cents		1935 Cents	1936 Cents	1937 Cents	1938 Cents
Jan.	12.70	11.91	13.06	8.57	Aug.	11.48	12.28	10.41	
Feb.	12.58	11.53	13.15	8.91	Sept.	10.80	12.31	9.02	
Mar.	11.63	11.43	14.46	8.92	Oct.	11.28	12.30	8.42	
Apr.	11.73	11.71	14.23	8.76	Nov.	12.01	12.23	7.96	
May	12.25	11.68	13.34	8.50	Dec.	11.99	12.83	8.26	
June	11.89	12.02	12.70		Average for Year	11.88	12.11	11.44	
July	12.26	13.11	12.26						

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1936*	ON HAND 1937	ON HAND 1938	AFLOAT 1936	AFLOAT 1937	AFLOAT 1938	ON HAND AND AFLOAT 1936*	ON HAND AND AFLOAT 1937	ON HAND AND AFLOAT 1938
Jan.	285,054	204,201*	269,078	43,870	55,096	57,356	328,924	259,297*	326,434
Feb.	282,902	195,080*	288,883	46,532	53,538	47,459	329,434	248,618*	336,342
Mar.	276,823	191,928*	299,172*	58,935	56,994	41,882	335,758	248,922*	341,054*
Apr.	277,478	176,289*	301,436	47,678	72,530	39,071	325,156	248,819*	340,507
May	262,415	172,985		48,860	58,542		311,275	231,527	
June	245,544	169,646		47,228	57,215		292,782	226,861	
July	235,850	164,445		60,343	75,779		296,193	240,224	
Aug.	230,167	171,052		63,597	80,439		293,764	251,491	
Sept.	233,336	182,556		62,240	83,288		295,576	265,844	
Oct.	224,000	195,685		67,825	80,653		291,825	276,338	
Nov.	211,480	217,586		73,691	81,302		285,171	298,888	
Dec.	223,000	256,618		56,567	63,099		279,567	319,717	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1936	London 1937	London 1938	Liverpool 1936	Liverpool 1937	Liverpool 1938
January	84,791	29,005	40,203	77,188	41,895	21,711
February	79,757	26,508	46,596	77,138	37,078	24,737
March	74,779	21,292	50,233	72,823	30,622	26,220
April	68,932	21,128	54,296	71,388	27,443	28,277
May	61,349	21,351		69,150	25,081	
June	55,993	21,964		66,173	21,258	
July	49,575	22,589		63,715	19,424	
August	45,749	25,211		62,367	19,817	
September	44,364	28,462		59,485	21,190	
October	40,777	30,465		55,738	21,327	
November	37,495	33,304		51,184	21,399	
December	33,027	35,633		45,291	21,978	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [3]	Holland	Para and Manaos
At end of 1937					
May	34,234	40,253	3,781	94	3,559*
June	45,085	48,545	4,558	98	1,019
July	44,759	43,270	3,725	124	1,050
August	47,873*	44,775	4,454	144	1,133
September	49,438*	38,131	5,294	135	1,543
October	41,948*	43,900	4,743	117	1,780
November	38,778	45,854	5,378	105	2,901
December	44,792*	45,734	5,632	100	1,771*
At end of 1938					
January	48,494*	49,643	5,976	131	2,024
February	46,241	47,990	5,653	169	2,342
March	50,797	48,473	5,490	180	1,202

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

End of:	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
1937				
February	53,538	27,250	13,212	94,000
March	56,994	31,240	36,766	125,000
April	72,530	34,410	17,060	124,000
May	58,542	31,500	26,958	117,000
June	57,215	34,700	33,085	125,000
July	75,779	45,100	23,121	144,000
August	80,439	40,300	19,261	140,000
September	83,288	37,400	20,312	141,000
October	80,653	35,000	19,347	135,000
November	81,302	39,100	6,598	127,000
December	63,099	45,100	26,801	135,000
1938				
January	57,356	40,500	15,644	113,000
February	47,459	41,000	19,541	108,000
March	41,882	40,000	26,318	109,000
April	39,071	45,000	28,929	113,000

* *Total Afloat* is an arbitrary estimate based on 1⅓ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL PRINCIPAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1933	1934	1935	1936*	1937	1938
January	634,797	661,948	698,153	600,479	454,249*	551,632*
February	626,227	663,308	686,195	599,355	445,265*	569,242*
March	638,428	666,382	678,809	583,318	447,856*	591,968
April	629,159	658,796	677,006	567,172	428,249*	
May	626,537	689,239	677,569	541,871	413,134*	
June	613,055	672,804	671,525	520,255	434,250*	
July	618,258	676,200	679,061	519,074	445,782	
August	617,449	674,702	680,644	500,520	457,462*	
September	623,683	694,361	661,509	493,585	470,768*	
October	636,597	680,616	655,000	486,159	479,398*	
November	642,968	684,408	617,300*	466,491	493,266*	
December	654,890	705,975	613,987*	466,576	545,533*	
Monthly Avge.	630,171	677,395	666,397*	528,738	460,022*	

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Quarter	Production Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	12,323	11,004	6,635	13,437	13,355	11,798	16,142	7,714
Apr.-June	16,295	12,980	14,412	13,565	12,597	15,443	16,421	
July-Sept.	12,004	9,245	14,707	9,822	11,312	15,467	12,659	
Oct.-Dec.	8,117	6,856	9,550	10,406	12,099	15,409	10,063	
Total	48,739	40,085	45,304	47,230	49,363	58,117	55,285	

Quarter	Shipment Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	11,268	8,760	6,981	10,730	11,154	10,944	14,667	7,716
Apr.-June	15,919	18,021	15,139	14,998	13,473	16,530	16,324	
July-Sept.	14,354	8,141	13,707	11,648	13,489	14,558	13,591	
Oct.-Dec.	8,510	5,329	8,265	9,310	12,066	13,331	10,864	
Total	50,051	40,251	44,092	46,686	50,182	55,363	55,446	

Quarter	Inventory Figures [2] 1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar	10,014	9,878	7,290	11,651	11,675	9,087	12,488	10,808
Apr.-June	10,447	4,999	6,615	10,219	10,755	7,835	12,529	
July-Sept.	8,158	6,096	7,595	8,419	8,288	9,012	11,615	
Oct.-Dec.	7,775	7,644	8,888	9,455	8,196	11,114	10,767	

Figures for Recent Months

	PRODUCTION 1936	1937	1938	SHIPMENTS 1936	1937	1938	INVENTORY [2] 1936	1937	1938
Apr.	4,857	5,730	2,706	4,904	5,560	3,199	11,003	12,629	10,317
May	4,974	5,352		5,833	5,375		11,131	12,592	
June	5,612	5,339		5,793	5,389		10,755	12,529	

AUTOMOBILE INNER TUBES

Quarter	Production Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	11,989	10,721	6,230	12,823	12,553	11,935	15,714	6,938
Apr.-June	15,388	11,913	13,001	13,191	11,631	14,678	15,299	
July-Sept.	12,839	8,286	14,356	10,321	11,270	15,377	11,949	
Oct.-Dec.	8,117	5,970	9,000	9,891	12,425	15,257	9,024	
Total	48,333	36,890	42,587	46,226	47,879	57,247	51,986	

Quarter	Shipment Figures on Quarterly Basis 1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	11,251	8,918	6,539	10,640	11,252	11,410	14,498	6,969
Apr.-June	15,314	16,271	13,292	14,553	11,928	15,169	15,381	
July-Sept.	15,282	7,761	13,370	11,545	13,251	15,125	12,805	
Oct.-Dec.	8,174	4,961	8,189	8,306	11,636	12,921	9,693	
Total	50,021	37,911	41,390	45,044	48,067	54,625	52,377	

Quarter	Inventory Figures [2] 1931	1932	1933	1934	1935	1936	1937	1938
Jan.-Mar.	10,475	9,448	6,369	10,244	10,406	8,692	11,904	10,093
Apr.-June	10,504	5,174	6,097	8,795	10,050	8,105	11,746	
July-Sept.	8,095	5,753	7,008	7,639	7,565	8,627	11,242	
Oct.-Dec.	7,922	6,749	7,815	9,180	8,231	10,985	10,235	

Figures for Recent Months

	PRODUCTION 1936	1937	1938	SHIPMENTS 1936	1937	1938	INVENTORY [2] 1936	1937	1938
Apr.	4,824	5,627	2,142	4,746	5,325	2,704	8,788	12,218	9,525
May	4,819	4,956		4,919	5,028		8,719	12,107	
June	5,035	4,716		5,504	5,027		8,105	11,746	

[1] Based on reports received from the Rubber Manufacturers Association.
[2] Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937*	4,808,974	3,915,889	893,085	207,000	152,631	54,369	5,015,974
1937*							
Oct.	329,876	298,662	31,214	8,103	7,378	725	337,979
Nov.	360,055	295,328	64,727	16,574	13,793	2,781	376,629
Dec.	326,234	244,385	81,849	20,652	14,384	6,268	346,886
1938							
Jan.*	210,120	156,062	54,058	17,624	13,385	4,239	227,744
Feb.	186,806	139,519	47,287	16,066	11,753	4,313	202,872
Mar.	221,951	174,151	47,800	16,802	12,276	4,526	238,753
Apr.	219,314	176,078	43,236	18,819	14,033	4,786	228,133
May							
June							

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [6]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [6]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	37,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	30,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,550
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	35,551	83,978	125,969	208,699	43,387	15,576	12,721	1,120,576
1936:															
Nov.	47,342	16,923	30,419	4,960	1,322	1,950	701	2,260	5,398	7,109	16,718	3,872	1,592	1,163	77,464
Dec.	38,714	9,758	28,956	4,377	1,844		506	2,988	6,472	10,129	9,536	8,450	1,721	1,087	76,072
1937:															
Jan.	41,571	16,956	24,615	4,514	1,066	4,015	1,234	3,849	5,136	7,962	13,067	2,823	1,271	943	70,495
Feb.	38,058	14,048	24,010	5,603	1,876	2,015	790	3,554	5,484	7,616	12,486	3,081	1,692	929	69,136
Mar.	59,568	19,579	39,989	7,049	2,034	1,425	1,239	3,873	7,856	11,817	19,903	3,160	1,749	872	100,966
Apr.	58,718	17,136	41,582	3,419	1,186	2,960	783	1,899	6,999	8,916	15,944	2,098	1,522	962	88,270
May	51,152	17,350	33,802	4,607	1,007	742	778	2,238	7,530	8,939	20,835	2,888	1,063	1,010	85,439
June	54,809	23,614	31,195	5,149	1,092	1,890	813	2,933	8,269	12,290	24,804	3,673	762	945	93,815
July	71,863	26,100	45,763	6,279	966	2,543	1,414	3,175	7,512	11,557	23,520	5,563	854	1,416	110,562
Aug.	64,525	21,395	43,130	7,308	605	1,624	1,189	2,999	6,785	11,563	21,014	2,277	1,248	1,283	101,025
Sept.	67,414	19,065	48,349	5,804	1,092	2,659	969	3,173	6,402	10,862	19,611	4,131	1,007	1,145	105,204
Oct.	59,319	11,858	47,461	6,701	1,248	523	1,505	2,352	6,587	12,172	14,188	3,753	1,434	1,147	99,071
Nov.	57,850	12,396	45,454	4,391	2,135	2,517	1,327	2,549	6,310	10,003	11,596	4,556	963	1,037	92,838
Dec.	56,791	13,949	42,842	9,529	2,708	3,009	1,172	2,957	9,108	12,272	11,731	5,384	2,011	1,032	103,755
1938:															
Jan.	47,986	17,078	30,908	5,013	1,379	3,485	1,307	2,897	4,476	9,283	12,501	6,086	878	1,400*	79,613
Feb.	48,899	11,874	37,025	5,216	1,423	8	918	3,266	6,391	8,793	12,023	3,068	1,542	1,400*	81,056
Mar.	49,197	15,813	33,384	3,834	1,247	1,564	853	2,837	5,668	10,156	15,284	3,213	1,831	1,200*	80,209
Apr.	53,864	9,158	44,706	1,951		1,728	1,158	1,427				3,646			

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ¼ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Nether-lands	Scandi-navia (abcdf)	Spain (g)	Czecho-slovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,646	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	28,904	19,164	14,970	4,343	4,680	2,400	13,063	1,063,798
1936:															
Nov.	37,897	—742	3,282	6,500	4,308	3,961	1,500*	2,162	964	1,090	445	1,388	200*	823	63,778
Dec.	50,838	—4,926	4,688	7,458	1,193	8,698	1,500*	3,426	1,184	759	276	1,206	200*	1,701	78,201
1937:															
Jan.	42,655	33	4,430	7,041	1,632	8,357	1,700	2,633	582	854	269	1,115	200*	567	72,068
Feb.	44,398	—222	5,296	7,911	1,271	6,630	1,502	3,048	304	1,363	245	452	200*	837	73,235
Mar.	39,888	343	5,347	7,668	2,612	6,935	2,119	3,598	1,293	1,641	371	709	200*	601	73,325
Apr.	42,066	3,808	5,291	8,664	1,343	5,837	1,669	1,532	1,058	1,069	362	1,070	200*	1,445	75,414
May	48,506	6,100	5,558	6,706	4,187	8,596	2,772	1,886	1,290	2,113	361	1,576	200*	925	90,776
June	48,972	5,157	6,010	6,469	3,791	7,608	1,958	3,940	2,226	1,630	521	1,802	200*	1,150	91,434
July	43,018	10,628	4,306	7,860	1,946	4,851	2,719	2,150	1,902	851	497	1,409	200*	753	83,090
Aug.	49,485	15,757	4,488	8,752	3,506	4,409	2,569	1,226	2,153	1,013	382	1,386	200*	1,692	97,018
Sept.	56,685	15,671	4,820	10,595	2,396	3,666	1,941	1,391	3,184	1,258	337	1,648	200*	1,369	105,161
Oct.	52,926	11,899	4,278	8,076	5,998	2,059	951	2,500*	2,470	967	367	1,535	200*	988	95,214
Nov.	54,135	12,878	4,311	8,848	4,787	1,368	2,857	2,500*	1,935	925	313	970	200*	846	96,873
Dec.	69,660	10,655	5,736	9,580	2,619	1,995	1,976	2,500*	767	1,286	318	1,008	200*	1,890	110,190
1938:															
Jan.	45,596	15,458	4,769	6,314	1,789	4,935	1,857	2,500*	574	1,257	300	1,239	200*	1,102	87,890
Feb.	40,977	16,505	5,456	6,959	615	3,173	2,053	2,500*	578	974	534	1,114	200*	1,771	83,002
Mar.	42,075	15,911	4,845	10,768	2,123		1,365	2,500*	1,043	761	342	1,088	200*	1,324	

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

ADVERTISING PAGES REMOVED

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials

ACCELERATORS—
El-Sixty, Ureka C, Guantal, Ureka, A-1, A-10, A-19, A-32, A-100, Pipsolene, Pip-Pip, DPG, R-2.
ANTIOXIDANTS — Flectols B, H, White.
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Bldg., Akron, Ohio

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 26 years.*
The Aluminum Flake Co.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

CARBON BLACK—*Micronex*
the world's standard gas black universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

RATES
for Listings in this Section

●

$5.00 per listing per month.

10% Discount if 2 listings per month are used.

15% Discount for 3 or more listings per month.

Copy Subject to Style Regulations.
No cuts accepted.

CARBON BLACK
CONTINENTAL
The Newest Name in Carbon Black offers
CONTINENTAL DUSTLESS
CONTINENTAL COMPRESSED
CONTINENTAL UNCOMPRESSED
Continental Carbon Company
295 Madison Ave., New York, N.Y.

CARBON BLACK— *Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Grant Building, Pittsburgh, Pa.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

CHEMICALS

For Rubber		For Industry Generally
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

CHEMICALS and Mineral
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosenbank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Laboratories Div.
1012 Second National Building
Akron, Ohio

THE MARKET PLACE Section Continued on Next Page